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Department of Water Supply, Gas and Electricity

OF THE CITY OF NEW YORK

ANNUAL REPORT

1906

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ANNUAL REPORT

OF THE

Department of Water Supply, Gas and Electricity

OF

THE CITY OF NEW YORK

1906.

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MARTIN B. BROWN
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NEW YORK

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

Report for the Year 1906.

Department of Water Supply, Gas and Electricity,
Commissioner's Office, Nos. 13 to 21 Park Row,
City of New York, January 8, 1908.

Hon. GEORGE B. McCLELLAN, Mayor, New York:

Sir—I beg to submit the report of the Department of Water Supply, Gas and Electricity for the year 1906, embodying several reports of the Deputy Commissioners and Division Chiefs, wherein the transactions and work accomplished by the Department are referred to and described in detail.

The report of Chief Engineer I. M. de Varona shows the actual cost of delivery, distribution and maintenance of the water supply for the entire City, making reference to Brooklyn water system for the first six months of the year only, during which time it was under his direct charge and supervision, he being superseded by John W. McKay, now Acting Chief Engineer for the Borough of Brooklyn.

Brooklyn's water supply was better than in some years previous. The Department was able to obtain additional water through the employment of improved well machinery and by utilizing sources of supply which developed during the construction of the infiltration gallery. While there was no actual reserve on hand, the yield of the different sources of supply was sufficient to meet the requirements of the Borough.

It is gratifying to note that the revenue derived from the sale of water in the Borough of Manhattan was the greatest in the history of the City, exceeding by more than $500,000 the largest amount ever previously received. In addition to this accomplishment, a house-to-house canvass has been made of practically the entire Borough, and as a result there were 8,500 water meters installed in business houses. Each of the other Boroughs shows an increase in collections, and has

also enforced strict compliance with the Charter regulations with respect to metering water furnished for business use.

Engineer C. F. Lacombe's report is the first comprehensive statement relating to public lighting which, I believe, has been made since consolidation, and shows precisely the actual cost of each system of lighting.

The reports of Electrical Engineers Frank E. Brown, referring to the Boroughs of Manhattan and The Bronx, and H. S. Wynkoop, for the Borough of Brooklyn, and Inspectors Burke and Sheridan, for the Boroughs of Queens and Richmond, respectively, make reference to the work carried on by the electrical division of this Department, showing the vast amount of work accomplished with the limited force of Inspectors, and also give some idea of the increased use of electricity as a means of illumination and power.

Respectfully,

JOHN H. O'BRIEN, Commissioner.

I.

OFFICE OF CHIEF ENGINEER.

Department of Water Supply, Gas and Electricity,
Office of Chief Engineer, Nos. 13 to 21 Park Row,
City of New York, March 18, 1907.

Hon. JOHN H. O'BRIEN, Commissioner:

Sir—I beg to report herewith on the condition of the water supply in the Boroughs of Manhattan, The Bronx, Queens and Richmond, for the year ending December 31, 1906; work done during the year on the supply and distribution system; expenditures provided for under the Tax Levy Budget, as well as under the appropriation made by Bond issues, and balances remaining on January 1, 1907.

On July 13, 1906, the work of the Engineer's Bureau in Brooklyn was separated from that of the other Boroughs and placed in charge of an Acting Chief Engineer. The first two quarterly reports for 1906, relating to the Borough of Brooklyn, were therefore prepared and submitted by me, so that I shall simply make hereafter a brief reference to the work done under my charge in that Borough, during the first half of the year, and to the general plan of development of which it formed part.

I have adhered to the plan outlined to embody in these reports a detailed record of the work done and cost thereof. The gathering and tabulation of the data required to carry out this plan have satisfactorily progressed, and an improvement in this respect will be apparent.

FINANCIAL.

Receipts and Expenditures

Receipts.

Borough of Manhattan—			
Regular annual frontage rates and penalties	$2,204,652 31		
Meter charges, buildings and steamboats	3,555,116 80		
Miscellaneous charges	121,614 36		
Total credit Sinking Fund, for the payment of interest on City debt		$5,881,383 47	
Permits for tapping... $6,907 00			
Repairs — Bureau of Chief Engineer.... 5.109 81			
Total credit of General Fund	12,016 81		
Meter setting, credit of Water Meter Fund No. 2	15,927 60		
Arrears, water charges, 1903 and prior, returned to Department of Finance, September, 1906			$149,558 77
Borough of The Bronx—			
Regular annual frontage rates and penalties	445,073 84		
Meter charges, buildings and Riverdale	225,864 75		
Miscellaneous charges	36,633 00		
Total credit of Sinking Fund, for the payment of interest on City Debt		707,571 59	
Permits for tapping, credit of General Fund	9,581 00		
Meter setting, credit of Water Fund No. 2	3,227 22		
Arrears, water charges, 1903 and prior, returned to Department of Finance, September, 1906			54,888 45
Total collections, 1906	$6,629,707 69		
Total credit of Sinking Fund, 1906		$6,588,955 06	
Total returns of arrears, 1906			$204,447 22

EXPENDITURES.

BOROUGHS OF MANHATTAN AND THE BRONX.

APPROPRIATIONS FOR 1906.

Salaries—Bureau of Chief Engineer—		
Appropriation with transfers	$12,200 00	
Expended per voucher, 1906	12,179 92	
Cash balance, January 1, 1907		$20 08
Salaries—Croton Water System—		
Appropriation with transfers	$33,037 00	
Expended per voucher, 1906	33,004 35	
Balance, January 1, 1907		$32 65
Salaries—Bronx River Works—		
Appropriation with transfers	$4,500 00	
Expended per voucher, 1906	4,500 00	
Balance, January 1, 1907		
Maintenance—Croton Water System—		
Appropriation with transfers	$396,554 50	
Expended per voucher, 1906.		
Salaries	$254,429 20	
Contracts	60,399 70	
Sundries	39,239 63	
	354,068 53	
Cash balance, January 1, 1907		$42,485 97
Bronx River Works—Maintenance and Repairs—		
Appropriation with transfers	$32,960 00	
Expended per voucher, 1906:		
Salaries	$26,518 00	
Sundries	3,890 61	
	30,408 61	
Cash balance, January 1, 1907	$2,551 39	
Outstanding liabilities	438 36	
Estimated balance, January 1, 1907		$2,113 03

Public Drinking Hydrants—

Appropriation with transfers	$3,000 00	
Expended per voucher, 1906	2,325 28	
Cash balance, January 1, 1907		$674 72

Repairing and Renewal Pipes, Stop-cocks, etc.

Appropriation with transfers	$367,010 00	
Expended per voucher, 1906:		
Salaries	$281,032 53	
Contracts	34,403 05	
Sundries	30,100 92	
	$345,536 50	
Cash balance, January 1, 1907		$21,473 50

Water Supply for the Twenty-fourth Ward.

Appropriation with transfers	$1,000 00	
Expended		
Cash balance, January 1, 1907		$1,000 00

APPROPRIATIONS FOR 1905.

Salaries, Bureau of Chief Engineer.

Balance January 1, 1906	$0 11	
Transferred by Board of Estimate and Apportionment	11	

Salaries, Croton Water System.

Balance, January 1, 1906	$85 09	
Transferred by Board of Estimate and Apportionment	85 09	

Maintenance, Croton Water System.

Balance January 1, 1906	$40,647 95	
Transferred from Board of Estimate and Apportionment	43,300 20	
	$83,948 15	
Expended per voucher, 1906:		
Salaries	$2,335 94	
Contracts	38,317 04	
Sundries	57,918 47	
	98,571 45	

Bronx River Works, Maintenance and Repairs.

Balance January 1, 1906		$1,369 08	
Transferred from Board of Estimate and Apportionment		8,317 35	
		$9,686 43	
Expended per voucher, 1906:			
Salaries	$259 50		
Sundries	2,866 24		
		3,125 74	
Cash balance January 1, 1907		$6,560 69	
Outstanding liabilities:			
Taxes		4,000 00	
Estimated balance			$2,560 69

Public Drinking Hydrants.

Balance January 1, 1906		$1,047 17	
Expended per voucher, 1906:			
Sundries	$397 62		
Transferred by Board of Estimate and Apportionment	550 00		
		947 62	
Cash balance January 1, 1907		$99 55	
Outstanding liabilities		75 00	
Estimated balance			$24 55

Repairing and Renewal of Pipes, Stop-Cocks, etc.

Balance January 1, 1906		$7,298 38	
Transferred from Board of Estimate and Apportionment		8,500 00	
		$15,798 38	
Expended per voucher, 1906:			
Salaries	$1,271 02		
Contracts	6,849 89		
Sundries	6,187 48		
		14,308 39	
Cash balance		$1,489 99	
Outstanding liabilities:			
Sundries		1,092 10	
Estimated balance			$397 89

Water Supply for the Twenty-fourth Ward.

Balance January 1, 1906	$127 64	
Transferred by Board of Estimate and Apportionment	127 64	

APPROPRIATIONS FOR 1904.

Salaries, Bureau of Chief Engineer.

Balance January 1, 1906	$354 09	
Transferred by Board of Estimate and Apportionment	354 09	

Salaries, Croton Water System.

Balance January 1, 1906	$1,505 40	
Transferred by Board of Estimate and Apportionment	1,505 40	

Maintenance, Croton Water System.

Balance, January 1, 1906	$8,013 69	
Credit by refunds	941 50	
Transferred from Board of Estimate and Apportionment	31,729 35	
	$40,684 54	
Expended per voucher, 1906:		
Sundries $475 00		
Taxes 40,102 06		
	40,577 06	
Cash balance		$107 48

Public Drinking Hydrants.

Balance, January 1, 1906	$693 82	
Transferred by Board of Estimate and Apportionment	693 82	

Bronx River Works, Maintenance and Repairs.

Balance, January 1, 1906	$1,890 03	
Transfer from Board of Estimate and Apportionment	7,827 07	
	$9,717 10	
Expended per voucher, 1906:		
Taxes	6,768 85	
Cash balance		$2,948 25

Repairing and Renewal of Pipes, etc.

Balance, January 1, 1906	$4,213 06	
Expended per voucher, 1906:		
Sundries	723 12	
Cash balance	$3,489 94	
Outstanding liabilities	343 00	
Estimated balance		$3,146 94

Water Supply for the Twenty-fourth Ward.

Balance, January 1, 1906	$2,159 53	
Transferred by Board of Estimate and Apportionment	2,159 53	
		

APPROPRIATIONS FOR 1903.

Maintenance, Croton Water System.

Balance, January 1, 1906	$15,361 41	
Transfer from Board of Estimate and Apportionment	41,069 11	
	$56,430 52	
Expended per voucher, 1906:		
Taxes	46,973 48	
Cash balance		$9,457 04

Bronx River Works. Maintenance and Repairs.

Balance, January 1, 1906	$10,841 50	
Expended per voucher, 1906:		
Taxes	5,260 97	
Cash balance		$5,580 53

APPROPRIATIONS FOR 1902.

Maintenance, Croton Water System.

Balance, January 1, 1906	$23,039 00	
Transfer from Board of Estimate and Apportionment	25,344 69	
	$48,383 69	
Expended per voucher, 1906	29,699 66	
Cash balance		$18,684 03

Bronx River Works. Maintenance and Repairs.

Balance, January 1, 1906	$5,920 86	
Expended per voucher, 1906:		
Taxes	3,973 34	
Cash balance		$1,947 52

BOND ACCOUNTS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Water Fund.

Balance, January 1, 1906	$3,478,042 48	
Expended per voucher, 1906:		
Salaries	$214,363 68	
Contracts	1,243,463 85	
Sundries	98,442 37	
	1,556,269 90	
Cash balance	$1,921,772 58	
Outstanding liabilities—		
Contracts	$1,822,730 82	
Sundries	15,302 26	
	1,838,033 08	
Estimated balance		$83,739 50

Water Main Fund No. 3.

Balance, January 1, 1906	$1,525 01	
Premiums, Board of Estimate and Apportionment	24 01	
	$1,549 02	
Expended	50 00	
Cash balance		$1,499 02

High-Pressure Fire Service.

Balance, January 1, 1906	$3,871,393 15	
Premiums, Board of Estimate and Apportionment	3,042 75	
	$3,874,435 90	

Expended per voucher, 1906:			
Salaries	$43,045 29		
Contracts	1,066,465 25		
Sundries	9,778 05		
		1,149,288 59	
Cash balance		$2,725,147 31	
Outstanding liabilities—			
Contracts	$2,272,717 72		
Sundries	1,515 58		
		2,274,233 30	
Estimated balance			$450,914 01

Additional Water Fund of The City of New York.

Balance, January 1, 1906	$44,324 61	
Expended per voucher, 1906	34,502 04	
Cash balance		$9,822 57

Water Mains, Southern Boulevard, near One Hundred and Forty-second Street.

Balance, January 1, 1906		$16,010 90	
Premiums, Board of Estimate and Apportionment		51	
		$16,011 41	
Expended per voucher, 1906:			
Contracts		11,792 72	
Cash balance		$4,218 69	
Outstanding liabilities—			
Contracts	$672 73		
Sundries	230 00		
		902 73	
Estimated balance			$3,315 96

Erection of Drinking Hydrants, Bronx.

Balance, January 1, 1906	$650 00	
Expended		
Cash balance		$650 00

Revenue Bond Fund. Emergency Force, etc.

Balance, January 1, 1906	$8,241 11	
Expended per voucher, 1906	3,016 83	
Cash balance		$5,224 28

Revenue Bond Fund to Pay Prevailing Rate of Wages to Enginemen, Manhattan and Queens.

Authorized by Board of Estimate and Apportionment	$4,762 50	
Expended	4,672 50	
Cash balance		$90 00

Selecting Site for Filter Plant and Preparing Plans and Specifications.

Authorized by Board of Estimate and Apportionment		$25 000 00	
Expended per voucher, 1906:			
Salaries	$13,571 71		
Contracts	4,007 70		
Sundries	830 61		
		18,419 02	
Cash balance		$6,589 98	
Outstanding liabilities—			
Contracts	$3,817 75		
Sundries	1,240 00		
		5,057 75	
Estimated balance			$1,532 23

	Funds With Transfers Available in 1906.
Appropriation Accounts.	
Salaries, Bureau of Chief Engineer—	
1906	$12,200 00
1905	11
1904	354 09
Salaries, Croton Water System—	
1906	33,037 00
1905	85 09
1904	1,505 40
Salaries, Bronx River Works—	
1906	4,500 00
Maintenance, Croton Water System—	
1906	396,554 50
1905	83,948 15
1904	40,684 54
1903	56,430 52
1902	48,383 69
Bronx River Works, Maintenance and Repairs—	
1906	32,960 00
1905	9,686 43
1904	9,717 10
1903	10,841 50
1902	5,920 86
Public Drinking Hydrants—	
1906	3,000 00
1905	1,047 17
1904	693 82
Repairing and Renewal of Pipes, Stop Cocks, Etc.—	
1906	367,010 00
1905	15,798 38
1904	4,213 06

MARY.

TAN AND THE BRONX.

Expended in 1906.	Transfers by Board of Estimate and Apportionment.	Cash Balance January 1, 1907.	Estimated Liabilities January 1, 1907.	Estimated Balance January 1, 1907.
$12,179 92		$20 08		
.....	$0 11			
.....	354 09			
33,004 35		32 65		
.....	85 09			
.....	1,505 40			
4,500 00				
354,068 53		42,485 97		$42,485 97
98,571 45				
40,577 06		107 48		107 48
46,973 48		9,457 04		9,457 04
29,699 66		18,684 03		18,684 03
30,408 61		2,551 39	$438 36	2,113 03
3,125 74		6,560 69	4,000 00	2,560 69
6,768 85		2,948 25		2,948 25
5,260 97		5,580 53		5,580 53
3,973 34		1,947 52		1,947 52
2,325 28		674 72		674 72
397 62	550 00	99 55	75 00	24 55
.....	693 82			
345,536 50		21,473 50		21,473 50
14,308 39		1,489 99	1,092 10	397 89
723 12		3,489 94	343 00	3,146 94

	Funds With Transfers Available in 1906.
Water Supply for Twenty-fourth Ward—	
1906	1,000 00
1905	127 64
1904	2,159 53
Aqueduct, Repairs and Maintenance—	
1900	2,123 21
Additional Fire Hydrants—	
1902	2,198 11
Total disbursements, account appropriations	
Bond Accounts.	
Water Fund, Manhattan and The Bronx	3,478 042 48
Water Main Fund No. 3	1,549 02
High Pressure Fire Service	3,874.435 90
Additional Water Fund, City of New York	44,324 61
Water Mains, Southern Boulevard, The Bronx	16,011 41
Erection of Drinking Fountains, The Bronx	650 00
Revenue Bond Fund, Emergency Force, etc	8,241 11
Revenue Bond Fund, to Pay Prevailing Rate of Wages to Enginemen, Manhattan and Queens	4,762 50
Selecting Site for a Filter Plant and Preparing Plans and Specifications	25,000 00
Total disbursements, Bond Accounts	
Total expended, 1906	

Expended in 1906.		Transfers by Board of Estimate and Apportionment.	Cash Balance January 1, 1907.	Estimated Liabilities January 1, 1907.	Estimated Balance January 1, 1907.
.....			1,000 00		1,000 00
.....		127 64			
.....		2,159 53			
.....			2,123 21		2,123 21
.....			2,198 11		2,198 11
	$1,032,402 87				
$1,556,269 90			1,921,772 58	1,838,033 08	83,739 50
50 00			1,499 02		1,499 02
1,149,288 59			2,725,147 31	2,274,233 30	450,914 01
34,502 04			9,822 57		9,822 57
11,792 72			4,218 69	902 73	3,315 96
.....			650 00		650 00
3,016 83			5,224 28		
4,672 50			90 00		
18,410 02			6,589 98	5,057 75	1,532 23
	2,778,002 60				
	$3,810,405 47				

FINANCIAL.

Receipts and Expenditures.

BOROUGH OF QUEENS.

Receipts.

Regular annual frontage rates and penalties	$62,940 31	
Meter charges	122,840 37	
Miscellaneous charges	8,526 28	
Total, credit of various funds, Borough of Queens		$194,306 96

Expenditures.

APPROPRIATIONS FOR 1906.

Salaries, Office of Deputy Commissioner.

Appropriation with transfers	$21,050 00	
Expended, per voucher, 1906	19,678 26	
Cash balance		$1,371 74

Salaries, Pumping Stations.

Appropriation with transfers	$38,655 93	
Expended, per voucher, 1906	38,642 10	
Cash balance		$13 83

Pumping Stations, Fuel and Supplies.

Appropriation with transfers		$33,500 00	
Expended, per Voucher, 1906:			
Contracts	$20,366 12		
Sundries	4,853 76		
		25,219 88	
Cash balance		$8,280 12	

Outstanding Liabilities—			
Contracts	$3,971 48		
Sundries	907 62		
		4,879 10	
Estimated balance			$3,401 02

Maintenance and Repairs of Water Pipes, Etc.

Appropriation with transfers		$31,095 00	
Expended, per Voucher, 1906:			
Salaries	$25,404 01		
Sundries	5,631 15		
		31,035 16	
Cash balance			$59 84

Supplying Water to Long Island City.

Appropriation with transfers		$125,000 00	
Expended, per voucher, 1906		118,199 33	
Cash balance			$6,800 67

Rental of Fire Hydrants.

Appropriation with transfers		$53,000 00	
Expended, per voucher, 1906		25,832 95	
Cash balance			$27,167 05

APPROPRIATIONS FOR 1905.

Salaries, Office of Deputy Commissioner.

Balance, January 1, 1906		$127 79	
Transferred by Board of Estimate and Apportionment		92 50	
Cash balance			$35 29

Salaries, Pumping Stations.

Balance, January 1, 1906		$124 05	
Credit by refund		106 45	
		$230 50	

Expended, per Voucher, 1906:			
Salaries	$37 50		
Transferred by Board of Estimate and Apportionment	127 79		
		165 29	
Cash balance			$65 21

Pumping Stations, Fuel and Supplies.

Balance, January 1, 1906		$4,059 38	
Credit by refunds		5,328 59	
Transferred from Board of Estimate and Apportionment		1,800 00	
		$11,187 97	
Expended, per Voucher, 1906:			
Contracts	$5,284 64		
Sundries	5,550 96		
		10,835 60	
Cash balance			$352 37

Maintenance and Repairs of Water Pipes, Etc.

Balance, January 1, 1906		$705 22	
Transfer from Board of Estimate and Apportionment		1,100 00	
		$1,805 22	
Expended, per Voucher, 1906:			
Salaries	$246 37		
Sundries	1,498 52		
		1,744 89	
Cash balance		$60 33	
Outstanding liabilities		50 00	
Estimated balance			$10 33

Supplying Water to Long Island City.

Balance, January 1, 1906	$9,204 14	
Transfer from Board of Estimate and Apportionment	917 83	
	$10,121 97	
Expended, per voucher, 1906	10,121 97	

Rental of Fire Hydrants.

Balance, January 1, 1906	$26,352 30	
Transfer by Board of Estimate and Apportionment	1,148 45	
	$25,203 85	
Expended, per voucher, 1906	25,203 85	
		

APPROPRIATIONS FOR 1904.

Salaries, Office of Deputy Commissioner.

Balance, January 1, 1906	$1,057 79	
Transferred by Board of Estimate and Apportionment	1,057 79	
		

Salaries, Pumping Stations.

Balance, January 1, 1906	$24 84	
Transferred by Board of Estimate and Apportionment	24 84	
		

Pumping Stations, Fuel and Supplies.

Balance, January 1, 1906	$381 44	
Transferred by Board of Estimate and Apportionment	325 00	
Cash balance	$56 44	
Outstanding liabilities	56 44	
		

Maintenance and Repairs of Water Pipes, Etc.

Balance, January 1, 1906	$507 18	
Transferred by Board of Estimate and Apportionment	250 00	
Cash balance		$257 18

Supplying Water to Long Island City.

Balance, January 1, 1906	$4,659 08	
Transferred by Board of Estimate and Apportionment	4,309 08	
	$350 00	
Expended, per voucher, 1906	350 00	

Rental of Fire Hydrants.

Balance, January 1, 1906	$1,442 45	
Transferred by Board of Estimate and Apportionment	1,442 45	

BOND ACCOUNTS.

Water Fund.

BOROUGH OF QUEENS.

Balance, January 1, 1906		$809,604 93	
Premiums, Board of Estimate and Apportionment		3,601 50	
		$813,206 43	
Amount expended previous to 1906		275,000 00	
Cash balance		$538,206 43	
Expended, per Voucher, 1906:			
Salaries	$25,250 24		
Contracts	135,786 86		
Sundries	12,035 87		
		173,072 97	
Cash balance		$365,133 46	
Outstanding Liabilities—			
Contracts	$102,018 58		
Sundries	6,728 72		
		108,747 30	
Estimated balance			$256,386 16

Revenue Bond Fund for Laying Water Mains.

Balance, January 1, 1906	$148 00	
Expended, per voucher,	1 33	
Cash balance		$146 67

SUM

BOROUGH

	Funds Available During 1906.
Appropriation Accounts.	
Salaries, Office of Deputy Commissioner—	
1906	$21,050 00
1905	127 79
1904	1,057 79
Salaries, Pumping Stations—	
1906	38,655 93
1905	230 50
1904	24 84
Pumping Stations, Fuel and Supplies—	
1906	33,500 00
1905	11,187 97
1904	381 44
Maintenance and Repairs, Pipe, etc.—	
1906	31,095 00
1905	1,805 22
1904	507 18
Supplying Water to Long Island City—	
1906	125,000 00
1905	10,121 97
1904	4,659 08
Rental of Fire Hydrants—	
1906	53,000 00
1905	26,352 30
1904	1,442 45
Total disbursements, account appropriations	
Bond Accounts.	
Water Fund, Borough of Queens	535,206 43
Revenue Bond Fund for laying mains	148 00
Total disbursements, Bond Account	
Total expended during 1906	

MARY.

OF QUEENS.

Expended in 1906.		Transfers by Board of Estimate and Apportionment.	Cash Balance January 1, 1907.	Estimated Liabilities January 1, 1907.	Estimated Balance January 1, 1907.
$19,678 26			$1,371 74		
.....		$92 50	35 29		
.....		$1,057 79			
38,642 10			13 83		
37 50		127 79	65 21		
.....		24 84			
25,219 88			8,280 12	$4,879 10	$3,401 02
10,835 60			352 37		
.....		325 00		56 44	56 44
31,035 16			59 84		59 84
1,744 89			60 33	50 00	10 33
.....		250 00	257 18		
118,199 33			6,800 67		6,800 67
10,121 97					
350 00		4,309 08			
25,832 95			27,167 05		27,167 05
25,203 85		1,148 45			
.....		1,442 45			
	$306,907 49				
$173,072 97			365,133 46	108,747 30	256,386 16
1 33			146 67		
	173,074 30				
	$479,981 79				

FINANCIAL.

Receipts and Expenditures.

BOROUGH OF RICHMOND.

RECEIPTS.

Regular annual frontage rates and penalties	$383 84	
Meter charges	3,722 25	
Miscellaneous charges	104 90	
Total, credit of various funds, Borough of Richmond		$4,210 99

EXPENDITURES.

APPROPRIATIONS FOR 1906.

Salaries, Office of Deputy Commissioner.

Appropriation, with transfers, 1906	$6,900 00	
Expended, per voucher, 1906	6,049 92	
Cash balance		$850 08

Pumping Stations, Salaries and Supplies.

Appropriation, with transfers, 1906		$13,000 00	
Expended, per voucher, 1906:			
Salaries	$6,543 40		
Contracts	3,375 00		
Sundries	1,763 52		
		11,681 92	
		$1,318 08	
Outstanding liabilities, contracts		1,000 00	
Cash balance			$318 08

Rental of Fire Hydrants.

Appropriation, with transfers, 1906	$30,052 50	
Expended, per voucher, 1906	14,597 50	
Cash balance		$15,455 00

APPROPRIATIONS FOR 1905.

Salaries, Office of Deputy Commissioner.

Balance, January 1, 1906	$25 97	
Transferred by Board of Estimate and Apportionment	9 30	
	$16 67	
Expended, per voucher, 1906	16 67	

Pumping Stations, Salaries and Supplies.

Balance, January 1, 1906	$2,354 82	
Transferred by Board of Estimate and Apportionment	1,231 12	
	$1,123 70	
Expended, per voucher, 1906:		
Salaries	$22 00	
Contracts	892 50	
Sundries	209 20	
	1,123 70	

Rental of Fire Hydrants.

Balance, with transfers, January 1, 1906	$29,052 50	
Expended, per vouchers audited by Finance Department	$21,218 69	
Transferred by Board of Estimate and Apportionment	51 62	
	21,270 31	
Cash balance		$7,782 19

APPROPRIATIONS FOR 1904.

Pumping Stations, Salaries and Supplies.

Balance, January 1, 1906	$108 94
Transferred by Board of Estimate and Apportionment	108 94

Rental of Fire Hydrants.

Balance, January 1, 1906	$14,300 00	
Transfer from Board of Estimate and Apportionment	14,502 50	
	$28,802 50	
Expended, per voucher, 1906, audited by Finance Department	25,267 30	
Cash balance		$3,535 20

APPROPRIATIONS FOR 1903.

Rental of Fire Hydrants.

Balance, January 1, 1906	$14,494 41	
Transfer from Board of Estimate and Apportionment	14,183 68	
	$28,678 09	
Expended, per voucher, 1906, Audited by Finance Department	21,103 45	
Cash balance		$7,574 64

BOND ACCOUNTS.

Water Fund.

Balance, January 1, 1906		$1,519,497 07	
Premiums, Board of Estimate and Apportionment		120 05	
		$1,519,617 12	
Expended, per voucher, 1906:			
Salaries	$5,681 57		
Sundries	9,353 79		
		15,035 36	
Cash balance		$1,504,581 76	
Outstanding liabilities—			
Contracts	$121,971 13		
Sundries	1,283 00		
		123,254 13	
Estimated balance			$1,381,327 63

Revenue Bond Fund, for Laying Water Mains in Village of Tottenville.

Balance, January 1, 1906	$1,138 19	
Expended		
Cash balance, January 1, 1907		$1,138 19

SUM

BOROUGH OF

	Funds Available During 1906.
Appropriation Accounts.	
Salaries, Office of Deputy Commissioner—	
1906	$6,900 00
1905	25 97
Pumping Stations, Salaries and Supplies—	
1906	13,000 00
1905	2,354 82
1904	108 94
Rental of Fire Hydrants—	
1906	30,052 50
1905	29,052 50
1904	28,802 50
1903	28,678 09
Total disbursements, account of appropriations	
Bond Accounts.	
Water Fund, Borough of Richmond	$1,519,617 12
Revenue Bond Fund, Village of Tottenville	1,138 19
Total disbursements, Bond accounts	
Total expended in 1906	

MARY.

RICHMOND.

Expended in 1906.		Transfers by Board of Estimate and Apportionment.	Cash Balance January 1, 1907.	Estimated Liabilities January 1, 1907.	Estimated Balance January 1, 1907.
$6,049 92			$850 08		
16 67		$9 30			
11,681 92			1,318 08	$1,000 00	$318 08
1,123 70		1,231 12			
.....		108 94			
14,597 50			15,455 00		15,455 00
21,218 69		51 62	7,782 19		7,782 19
25,267 30			3,535 20		3,535 20
21,103 45			7,574 64		7,574 64
	$101,059 15				
$15,035 36			1,504,581 76	123,254 13	1,381,327 63
.....			1,138 19		1,138 19
	15,035 36				
	$116,094 51				

Contracts Entered Into During the Year, 1906.

BOROUGHS OF MANHATTAN AND THE BRONX.

Manhattan Supply Company—Furnishing and delivering agricultural, mechanics' and hardware supplies..... $281 51

George T. Montgomery—Furnishing and delivering agricultural, mechanics' and hardware supplies..... $100 51

Hugh L. Fox—Furnishing and delivering agricultural, mechanics' and hardware supplies..... $543 33

Robert C. Ogden—Furnishing and delivering agricultural, mechanics' and hardware supplies..... $309 32

Timothy D. Gleason—Excavating and removing rock in hydrant trenches, etc..... $5,120 00

M. J. Drummond & Co.—Furnishing and delivering double nozzle standard New York hydrants, lead lined iron pipe, unions, elbows and couplings..... $4,567 75

John Fox & Co.—Furnishing and delivering single nozzle "A" hydrants and gate valves..... $5,700 00

Matthew M. O'Brien—Furnishing, delivering and setting double nozzle standard New York hydrants..... $17,437 75

Nicholas L. Stokes—Furnishing, delivering and storing anthracite coal.. $34,020 00

E. F. Schroeder—Furnishing and delivering and laying water mains in Columbus and Ninth avenues, etc..... $519,745 00

John L. Florence—Furnishing materials, repairing and restoring artificial stone sidewalks and curbing and resetting natural stone curbing.. $1,710 00

John Cornwell, Jr.—Furnishing, delivering and laying 12-inch flexible joint, subaqueous water mains..... $47,439 00.

John Fox & Co.—Furnishing and delivering tapping cocks, drills, nozzles, etc..... $1,608 00

Candee, Smith & Howland Company—Furnishing and delivering lime, sand, cement, etc. $683 60

John Fox & Co.—Furnishing and delivering 36-inch gate valves $2,972 00

H. Mueller Manufacturing Company—Furnishing and delivering tapping cocks, drills, nozzles, etc. $4,344 11

John Fox & Co.—Furnishing and delivering cast iron water pipes and special castings $45,303 35

C. Daly—Furnishing and delivering anthracite and bituminous coal, coke and cordwood $1,198 50

U. T. Hungerford Brass and Copper Company—Furnishing and delivering pig lead $4,536 00

Gallo & Pettelli—furnishing, delivering and laying water mains in Jerome and Davidson avenues, etc. $753,151 00

Gallo & Pettelli—Furnishing, delivering and laying 48-inch water main in Seventh avenue $312,537 00

J. P. Duffy & Co.—Furnishing and delivering filter sand, fire brick, etc. .. $896 32

John Fox & Co.—Furnishing and delivering wood plugs, hydrant eyes, etc. $2,754 50

John Fox & Co.—Furnishing and delivering stop-cocks, hydrants, etc. .. $17,597 50

Cavanagh Brothers & Co.—Furnishing and delivering cotton waste, yarn, etc. $2,674 05

Frank K. D'Ossone—Furnishing, repairing, placing and emptying vault pans $2,080 80

Manhattan Supply Company—Furnishing and delivering cotton waste, etc. $230 40

Charles S. Richards—Furnishing and delivering lubricating and illuminating oils, etc. $2,847 75

Borne, Scrymser Company—Furnishing and delivering lubricating and illuminating oils, etc. $495 75

Florence Iron Works—Furnishing and delivering double nozzle, standard New York hydrants and fittings $11,453.25

William E. Burke—Furnishing and delivering engineers' and draughtsmen's supplies $1,392 07

Louis D. Gregory—Furnishing, delivering and laying water mains in Boscobel, College, Grand, etc., avenues $112,435 30

William E. Burke—Furnishing and delivering steam and hydraulic packing $203 80

Hugh L. Fox—Furnishing and delivering steam and hydraulic packing $2,657 20

New York Belting and Packing Company—Furnishing and delivering steam and hydraulic packing $360 90

Louis D. Gregory—Furnishing, delivering and laying 36-inch water main in Southern boulevard $6,795 00

Louis D. Gregory—Hauling and laying 20-inch water main in Two Hundred and Thirty-third street $2,193 10

William Horne Company—Furnishing and installing steam piping, Jerome Park and One Hundred and Seventy-ninth Street Pumping Stations .. $6,007 00

Garlock Packing Company—Furnishing and delivering steam and hydraulic packing $533 70

Michael D'Ambra—Furnishing, delivering and laying water mains in Kent, Morningside and New avenues $98,145 85

Michael D'Ambra—Furnishing, delivering and laying water mains in Bailey, Grant, Morris, etc., avenues $64,936 00

Howard S. Bowns—Furnishing, delivering and storing anthracite coal ... $76,244 00

Michael D'Ambra—Furnishing, delivering and laying water mains in Classon, Commonwealth, Pratt, etc., avenues..... $39,515 00

Leslie McHarg & Co.—Furnishing all the labor and materials to construct an experimental filter station..... $7,824 75

Louis D. Gregory—Hauling and laying water mains in Tiebout avenue... $1,806 30

George I. Wakeman—Furnishing materials, paving and restoring artificial stone sidewalk $1,900 00

Louis D. Gregory—Hauling and laying 12-inch water main in Broadway.. $3,740 75

Walter J. Drummond—Furnishing and delivering double nozzle, New York hydrants $2,728 00

Ferrara & Tuccillo—Furnishing, delivering and laying water mains in Edgecombe, Fulton, Mohawk, etc., avenues..... $28,279 60

High Pressure Fire Service.

Continental Asphalt Paving Company—Furnishing, delivering and constructing salt water suction mains..... $63,682 00

Thos. Cockerill & Son—Furnishing, constructing and erecting High Pressure Fire Service Engine House at Gansevoort and West streets.... $69,527 00

Thos. Cockerill & Son—Furnishing, constructing and erecting High Pressure Fire Service Engine House, Oliver and South streets..... $71,334 00

Frank J. Fee—Furnish, deliver and erect plumbing and gas fitting, at the High Pressure Fire Service Station, Gansevoort and West streets.... $1,885 00

Frank J. Fee—Furnishing, delivering and erecting plumbing and gas fitting at the High Pressure Fire Service Station, Oliver and South streets $1,885 00

BOROUGH OF QUEENS.

M. D'Ambra & Co.—Furnishing, delivering and laying water mains in Van Alst, Harris, Woolsey streets, etc..... $92,353 05

M. D'Ambra & Co.—Furnishing, delivering and laying water mains in Bradish, Shaw and Waldo avenues, etc..... $8,129 20

A. J. McCollum—Furnishing, delivering and storing anthracite coal..... $24,337 60

James P. Graham—Furnishing, delivering and laying water mains in Debevoise, Dittmars and Freeman streets..... $73,946 64

Rudolph Reimer—Furnishing, delivering and storing anthracite coal..... $4,480 00

BOROUGH OF RICHMOND.

G. W. DuBois—Furnishing, delivering and storing anthracite coal..... $4,375 00

John A. Consalus—Furnishing, delivering and laying water mains in Hillside, Huguenot, Riverside, etc., avenues..... $121,971 31

Water Consumption, Rainfall and Storage.

Tables 1 to 7 give the details of the water consumption in the Boroughs of Manhattan and The Bronx.

Plate No. 1 shows the capacity curve for the old and new aqueducts constructed from the most recent gaugings taken up to date. This curve has been used in obtaining the figures given in the tables.

In connection with the measurements and observations taken in preparation of plans for filtration of the Croton water supply, the new aqueduct was closed on July 6 and partially cleaned. The screens at Gould's Swamp syphon were cleaned of a considerable accumulation of driftwood, and a brick bulkhead about three feet high at Shaft 11-A, which had been left there since the construction of the aqueduct was removed. On several other dates the conduit was closed to carry out the observations and measurements above referred to, to determine the flow and loss of head under different conditions.

Plate No. 2 gives diagrams of water on storage in the reservoirs of the Croton watershed, number of days supply on hand, consumption of Croton water, etc., for the years 1897 to 1906, inclusive, also the estimated population and consumption of Croton water for the years 1907 to 1916, inclusive.

CURVES

SHOWING FLOW OF WATER IN THE

OLD AND NEW CROTON AQUEDUCTS

USED BY THE DEP'T OF WATER SUPPLY, GAS & ELECTRICITY,

CITY OF NEW YORK, 1906.

Chief Engineer

——Curve "A" shows flow in New Aqueduct with 9% impairment (used up to July 8th)

— — " "B" " " " " " " 5% " (" after " " ")

—·—·— " "C" " " " Old " "

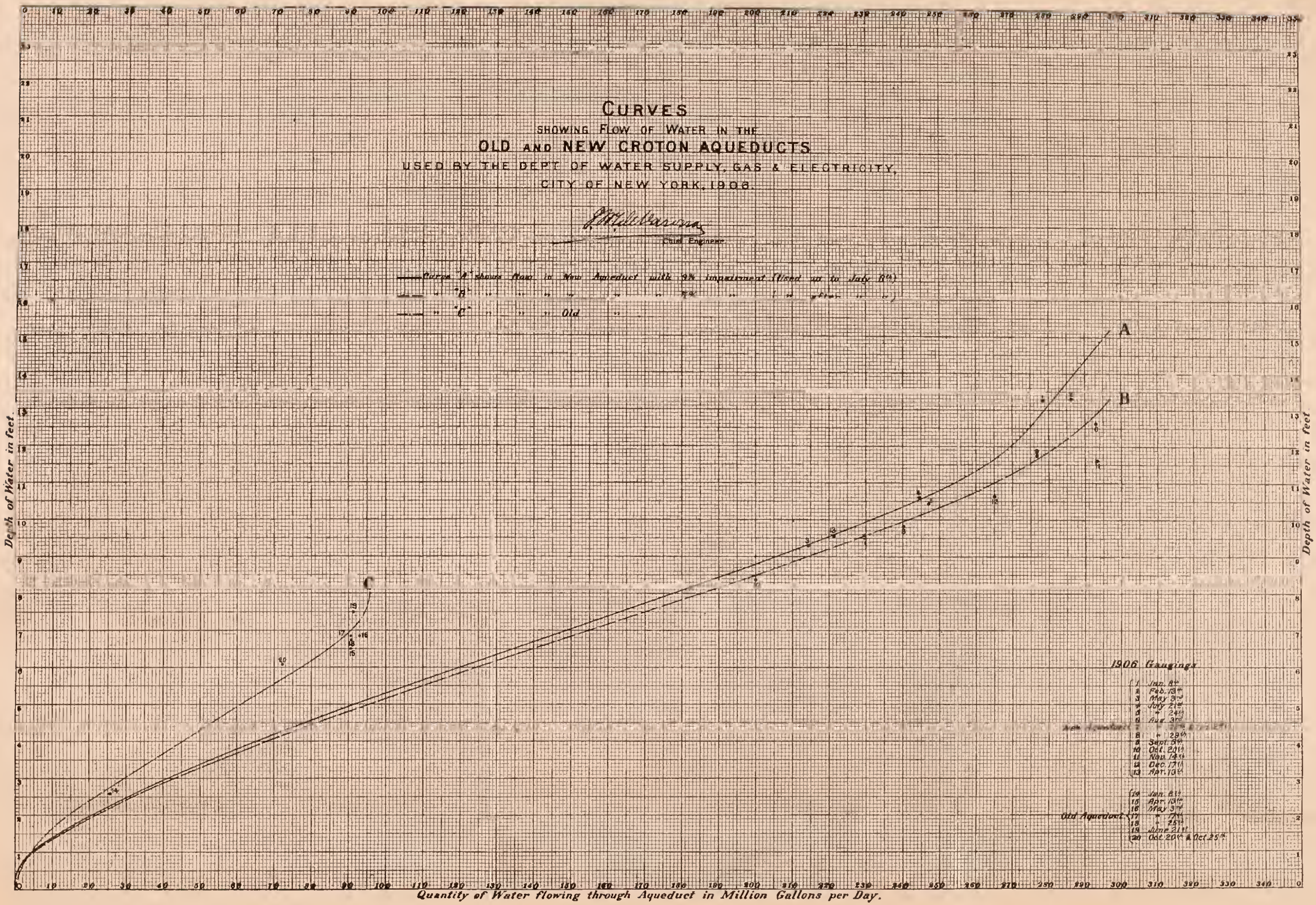


TABLE No. 1.

Average Daily Consumption in Million Gallons, Manhattan and The Bronx, 1906.

Month.	New Aqueduct.	Old Aqueduct.	Gain or Loss in Distributing Reservoirs.	Bronx and Byram.	Total, Manhattan and The Bronx.
January	281	22	—1	20	322
February	281	20	+3	22	326
March	281	35	—15	22	323
April	224	75	—2	21	318
May	209	88	...	21	318
June	218	89	+1	19	327
July	215	91	+4	20	330
August	210	85	...	18	313
September	246	69	—4	18	329
October	235	78	—3	20	330
November	229	79	—1	20	327
December	252	63	+2	19	336
Average	240	66	—1	20	325

TABLE No. 2.

Average Daily Consumption of Croton Water in Million Gallons for Each Month, From 1897 to 1906, Inclusive.

Month.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
January	206	204	218	248	254	262	274	283	298	302
February	207	206	233	251	252	261	271	293	303	304
March	202	202	226	233	251	256	267	282	301	301
April	193	197	218	236	234	258	264	277	298	297
May	190	195	218	239	238	255	265	279	296	297
June	193	205	228	250	247	257	263	290	298	308
July	197	209	224	254	264	258	272	292	306	310
August	194	213	232	259	267	263	267	284	302	295
September	201	223	227	260	265	270	271	290	301	311
October	196	217	230	255	266	264	265	288	304	310

Month.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
November	190	210	230	251	260	268	264	285	305	307
December	193	207	224	251	262	274	270	295	306	317
Average for year	197	209	226	249	255	262	268	287	301	305

Total consumption of Croton water for year 1906, 112,000 million gallons.

No water wasted over Croton Dam during year 1906.

TABLE No. 3.

Estimated Population and Average Daily Supply of Water Required for the Boroughs of Manhattan and The Bronx, From 1907 to 1916, Inclusive.

Year.	Estimated Population.	Estimated Consumption Per Capita in Gallons.	Estimated Average Daily Consumption in Gallons.
1907	2,541,000	137	348,000,000
1908	2,620,000	139	364,000,000
1909	2,703,000	141	381,000,000
1910	2,788,000	143	398,000,000
1911	2,876,000	145	417,000,000
1912	2,967,000	147	436,000,000
1913	3,062,000	149	456,000,000
1914	3,160,000	151	477,000,000
1915	3,262,000	153	499,000,000
1916	3,368,000	155	522,000,000

The figures in above table are shown graphically in Diagram Plate No. 2, which gives also the fluctuations in the storage for the past ten years, as well as the ranges of temperature. The estimates of population have been based on the Federal Census of 1900 and the State Census of 1905, as well as the records and estimates of the Health Department figured to July 1 of each year.

The increase in consumption has been estimated to be proportioned to that on population with a yearly addition of two gallons per day to the per capita consumption.

TABLE No. 4.

Rainfall, Croton Watershed, 1906.

Month.	Boyd's Corners.	Carmel Reservoir.	Middle Branch.	East Branch.	Amawalk (Muscoot).	Titicus Reservoir.	Croton Lake.	Average.
January	2.55	2.59	2.44	2.57	2.70	2.95	1.90	2.53
February	2.64	2.74	2.93	3.14	2.20	3.29	2.50	2.78
March	7.05	6.85	6.36	5.95	6.13	6.50	5.47	6.33
April	5.33	5.41	4.11	4.82	4.59	4.93	4.88	4.87
May	4.32	4.50	3.95	3.61	3.61	4.79	4.43	4.17
June	4.14	4.19	4.87	3.77	4.17	5.14	3.85	4.30
July	8.03	6.92	5.34	4.99	5.84	6.01	5.10	6.03
August	3.06	3.60	2.74	2.64	4.31	3.49	4.66	3.50
September	1.94	2.92	3.02	2.68	3.83	4.91	3.71	3.29
October	4.39	5.24	4.99	4.73	4.55	4.98	4.82	4.81
November	1.38	1.57	1.58	1.50	1.43	1.79	1.49	1.53
December	3.84	4.09	4.21	3.60	3.64	4.03	5.29	4.10
Total for year.	48.67	50.62	46.54	44.00	47.00	52.81	48.10	48.25
Toal for 1905								46.67

Kensico Rainfall, 1906.

January	3.00
February	3.37
March	6.18
April	5.90
May	5.49
June	4.70
July	5.78
August	2.93
September	3.30
October	4.95
November	1.85
December	5.19
Total for year	52.64
Total for 1905	51.51

TABLE No. 5.

Storage on the Croton Watershed in Million Gallons.

Name of Reservoir.	Total Contents When Full to Crest of Spillway.	September 30, 1906.		December 31, 1906.		Storage Drawn During Quarter Ending December 31, 1906.	Additional Water Stored During Quarter Ending December 31, 1906.
		Distance Below Spillway in Feet.	Storage on Hand in Million Gallons.	Distance Below Spillway in Feet.	Storage on Hand in Million Gallons.		
Boyds Corner	2,727	†....	2,727	17.78	1,330	1,397	
*West Branch (20-inch flashboard)	10,669	4.54	8,502	10.47	6,581	1,921	
*Middle Branch (12-inch flashboard)	4,155	†0.33	4,051	12.69	2,399	1,652	
East Branch	5,243	7.25	4,013	17.81	2,551	1,462	
Bog Brook	4,400	7.25	3,489	17.81	2,278	1,211	
*Titicus (24-inch flashboard)	7,617	6.87	5,742	25.64	2,711	3,031	
*Amawalk (Muscoot) (24-inch flashboard)	7,086	10.87	4,822	22.15	3,228	1,594	
New Croton (including old)	26,619	34.4	17,243	30.8	8,682		1,439
Muscoot	4,914	22.6	268	20.7	403		135
Mahopac	575	0.27	544	0.40	529	15	
Kirk	565	0.83	539	7.10	338	201	
Gleneida	165	†....	165	0.11	162	3	
Gilead	380	0.87	359	0.98	356	3	
Barretts Pond	170	†....	170	2.55	127	43	
White	200	0.08	198	0.30	191	7	
Total	75,485		42,832		31,866	12,540	1,574
Corresponding amount, December 31, 1905					19,258		
Net amount of storage lost						10,966	

* Flashboards on crest of spillway included.

† Over.

‡ Includes 2,000 Old Croton

Storage on The Bronx and Byram Watershed in Million Gallons.

Name of Reservoir.	Total Contents When Full to Crest of Spillway.	September 30, 1906.		December 31, 1906.		Storage Drawn During Quarter Ending December 31, 1906.	Additional Water Stored During Quarter Ending December 31, 1906.
		Distance Below Spillway in Feet.	Storage on Hand in Million Gallons.	Distance Below Spillway in Feet.	Storage on Hand in Million Gallons.		
*Kensico (24-inch flashboard)	1,797	4.50	1,284	3.76	1,337		53
*Byram (12-inch flashboard)	898	9.96	332	13.32	177	155	..
*Rye Ponds (12-inch flashboard)	1,440	†....	1,440	0.25	1,310	130	..
Wampus	60	†....	60	†....	60		..
Total	4,195		3,116		2,884	285	53
Corresponding amount, December 31, 1905					3,656		
Net amount of storage lost						232	

* Flashboards on crest of spillway included.

† Over.

Water was wasted over Kensico Dam during the year amounting to 1,437 million gallons.

During the year the west basin of Jerome Park Reservoir was filled from the old aqueduct. Contents at end of year were 731 million gallons.

In order to perform the necessary work in connection with Jerome Park Reservoir and to test the flow, the new aqueduct was shut down on following dates:

June 21, 17 hours; July 5, 24 hours; July 12, 24 hours; July 18, 26 hours; July 28, 29 hours; August 6, 21 hours; September 24, 26 hours; October 1, 24 hours; November 12, 21 hours; November 19, 15 hours.

The new aqueduct was cleaned on July 6.

TABLE No. 6.

Average Daily Flow of the Croton River in Million Gallons.

Month.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
January	336	232	719	690	438	811	469
February	1,370	101	618	780	574	*248	372
March	1,045	979	1,872	1,148	1,036	*824	836
April	378	1,484	630	662	625	*682	925
May	479	811	342	118	310	*175	320
June	138	315	161	646	228	228	289
July	86	270	140	298	162	72	217
August	23	822	109	289	232	99	183
September	60	422	136	355	499	261	75
October	105	509	459	952	302	141	192
November	259	243	279	335	270	118	163
December	365	894	1,049	516	209	226	221
Average for year	381	594	545	565	406	324	355

* Calculated from observed flow at New Croton Dam.

1900 to 1905, Inclusive—Computed from flow at old Croton Dam, with a drainage area of 338.8 square miles.

1906—Computed from flow at new Croton Dam, with a drainage area of 360.4 square miles.

TABLE No. 7.

Rainfall and Run-off on Croton Watershed.

Month.	1900.		1901.		1902.		1903.	
	Rainfall, Inches.	Run-off, Inches.	Rainfall, Inches.	Run-off, Inches.	Rainfall, Inches.	Run-off, Inches.	Rainfall, Inches.	Run-off, Inches.
January	3.76	1.77	1.63	1.22	2.91	3.79	4.34	3.63
February	7.66	6.51	0.84	0.44	4.04	2.94	4.88	3.71
March	4.77	5.50	7.18	5.15	6.42	9.86	5.56	6.04
April	2.03	1.93	8.19	7.56	4.42	3.21	2.97	3.37
May	5.87	2.52	7.01	4.27	3.57	1.81	1.05	0.62
June	2.44	0.70	1.48	1.60	4.69	0.82	11.26	3.29
July	3.87	0.45	8.35	1.42	4.29	0.74	2.90	1.57
August	2.38	0.12	9.03	4.33	2.52	0.57	7.74	1.52

Month.	1900.		1901.		1902.		1903.	
	Rainfall, Inches.	Run-off, Inches.	Rainfall, Inches.	Run-off, Inches.	Rainfall, Inches.	Run-off, Inches.	Rainfall, Inches.	Run-off, Inches.
September	3.36	0.31	5.49	2.15	6.34	0.70	3.03	1.81
October	4.17	0.55	3.94	2.68	6.23	2.41	7.86	5.01
November	5.36	1.32	1.80	1.24	0.90	1.42	2.76	1.71
December	2.52	1.92	8.81	4.71	7.15	5.52	4.48	2.71
Total.	48.19	23.60	63.75	36.81	53.48	33.79	58.83	34.99
Per cent		49		58		63		59

Month.	1904.		1905.		1906.	
	Rainfall, Inches.	Run off, Inches.	Rainfall, Inches.	Run-off, Inches.	Rainfall, Inches.	Run-off, Inches.
January	4.01	2.31	6.79	4.38	2.53	2.32
February	3.26	2.83	1.70	1.26	2.78	1.66
March	3.68	5.45	4.22	4.62	6.33	4.14
April	4.35	3.18	3.16	3.70	4.87	4.43
May	4.10	1.63	1.10	0.98	4.17	1.54
June	2.37	1.16	6.37	1.16	4.30	1.38
July	5.51	0.85	3.23	0.38	6.03	1.08
August	7.02	1.22	6.07	0.52	3.49	0.91
September	7.01	2.54	4.66	1.31	3.29	0.36
October	3.75	1.59	3.33	0.74	4.81	0.95
November	2.19	1.37	2.36	0.60	1.53	0.78
December	3.45	1.10	3.68	1.19	4.10	1.10
Total	50.70	25.23	46.67	20.84	48.23	20.65
Per cent		50		45		43

Prevention of Water Waste.

In my annual report for last year, attention was again called to the necessity of adopting measures to prevent waste, and the plan was outlined, detailing the method to be followed for that purpose, which comprised the investigation of mains, including examinations to determine the illegal use of water, if any, house to house inspection and installation of meters.

In February of the present year public notice was given that the Committee on Water Supply, Gas and Electricity of the Board of Aldermen would hold a public

hearing on February 21, 1906, in regard to an ordinance which had been introduced increasing the powers of the Commissioner of Water Supply, Gas and Electricity in regard to the installation of meters, and all persons interested in the above matter were invited to attend. The Commissioner of this department was particularly requested to be present, and under his instructions, and in his behalf, the Chief Engineer of this department appeared and stated that this department favored the installation of the meters, provided—

First—That the meters should be furnished and installed at the cost of the City, and not at the expense of the householder, as at present;

Second—That a flat minimum rate should be established, in order to prevent the curtailment of a free use of water in the poor tenement districts, among the people where it is most needed, and to prevent landlords otherwise disposed, to find any reasons for raising their rents;

Third—That the installation should be gradual, so as not only to distribute the expense, but to secure the necessary data for the permanent and advantageous work of the system.

At that hearing this department advocated the adoption of a plan under which several typical districts would be selected in which every house should be metered and observations as to the amount of water consumed would be carefully taken; also house to house inspection and investigation of the illegal use of water, if any, as will be more fully detailed hereafter.

The Merchants' Association of New York, who had given considerable attention to this subject, decided that the adoption of the plan proposed by the Commissioner of the Department, as above outlined, would be advantageous to the City and effectual in securing the desired object. They had, therefore, a bill introduced in the Legislature, which became a law on May 24, 1906, and is known as chapter 611 of the Laws of 1906, and entitled "An act to provide for obtaining information as to the consumption and waste of water in The City of New York." The main provisions of the act are as follows:

The Commissioner, when authorized by the Board of Estimate and Apportionment, shall proceed to designate the districts and areas which he may deem are the best for acquiring complete and reliable information as to the consumption and waste of water, and shall install in those districts, without expense to the consumer, water meters. The Commissioner's agents and inspectors shall be authorized to enter upon any premises where meters are thus installed, and to make such examinations or do such other acts as may be required to accomplish the purpose of the enactment. Suitable readings of the meters shall be taken and carefully recorded, so as to be accessible to the public. Analysis of these records shall be made and reported to the Board of Estimate and Apportionment on or before the 1st day of January, 1907, with the Commissioner's recommendation as to the advisability of metering all water service pipes in the city, and as to the rates which should be charged all classes of con-

sumers of water. The meters thus installed shall be and remain the property of The City of New York, and at all times under the supervision and control of the Commissioner of this Department.

The expense of carrying into effect the provisions and intent of the Act shall be borne and paid by The City of New York, and the necessary funds provided, as prescribed in the act.

On October 16, in accordance with instructions previously received, a full report on the necessary measures to comply with the act above mentioned, was submitted to you by the writer. Nine typical districts in Manhattan and The Bronx and seven similar districts in Brooklyn were specified as those which "will furnish the best opportunities for acquiring complete and reliable information as to the consumption and waste of water," in accordance with the specific terms of the act, these districts embracing:

1. Typical Italian tenements (low service).
2. Good class private houses and medium class apartment houses (tower high service).
3. Medium class apartment houses and private houses (reservoir high service).
4. Typical Hebrew tenements, new buildings (low service).
5. Medium class flat and two-family houses (low service).
6. Of the same character as No. 5, but in high pressure service.
7. Typical Jewish tenements, buildings several years old, remodelled.
8. Two and three-story frame houses.
9. High class apartment houses.

The number of taps reported for Manhattan and The Bronx was about 1,400, and for the Borough of Brooklyn about 1,010, and the cost of furnishing and installing the meters was estimated:

For the Borough of Brooklyn, at	$16,500 00
And for the Boroughs of Manhattan and The Bronx	28,000 00
Making a total of	$44,500 00

It was proposed that after the installation of the meters, readings should be taken for a certain time to ascertain existing conditions, after which a rigid house to house inspection would be maintained to insure the proper condition of the fixtures, so that we might be able to determine the difference between the water as then used and the amount required with the fixtures in proper order, and the necessary Inspectors were proposed, to make the requisite examinations. The yearly cost of these Inspectors was estimated,

For Manhattan and The Bronx, at	$6,050 00
—and for Brooklyn, at	5,050 00
—making a total of	$11,100 00

It was proposed that an Assistant Engineer, competent and experienced, should have general and entire supervision of the above work, as well as over that of the investigations of the illegal use of water and house to house inspection.

The method of conducting these investigations was fully detailed in that report.

The total cost of the instruments and appurtenances required for this work was estimated as follows:

For Manhattan and The Bronx	$15,000 00
For Brooklyn	13,000 00
—making a total of	$28,000 00

The total yearly cost of the salaries required for this work in Manhattan and The Bronx was given as $14,062 50
—and for Brooklyn 14,062 50

—making a total of $28,125 00

The investigations were to be conducted for not less than six months, at the end of which time the advisability of prolonging them would be passed upon. At the end of this observation the following data would have been secured, i. e.:

First—The amount of water consumed with the fixtures in the condition in which they were found.

Second—The amount of water used with the fixtures in good order and therefore the amount of preventable waste.

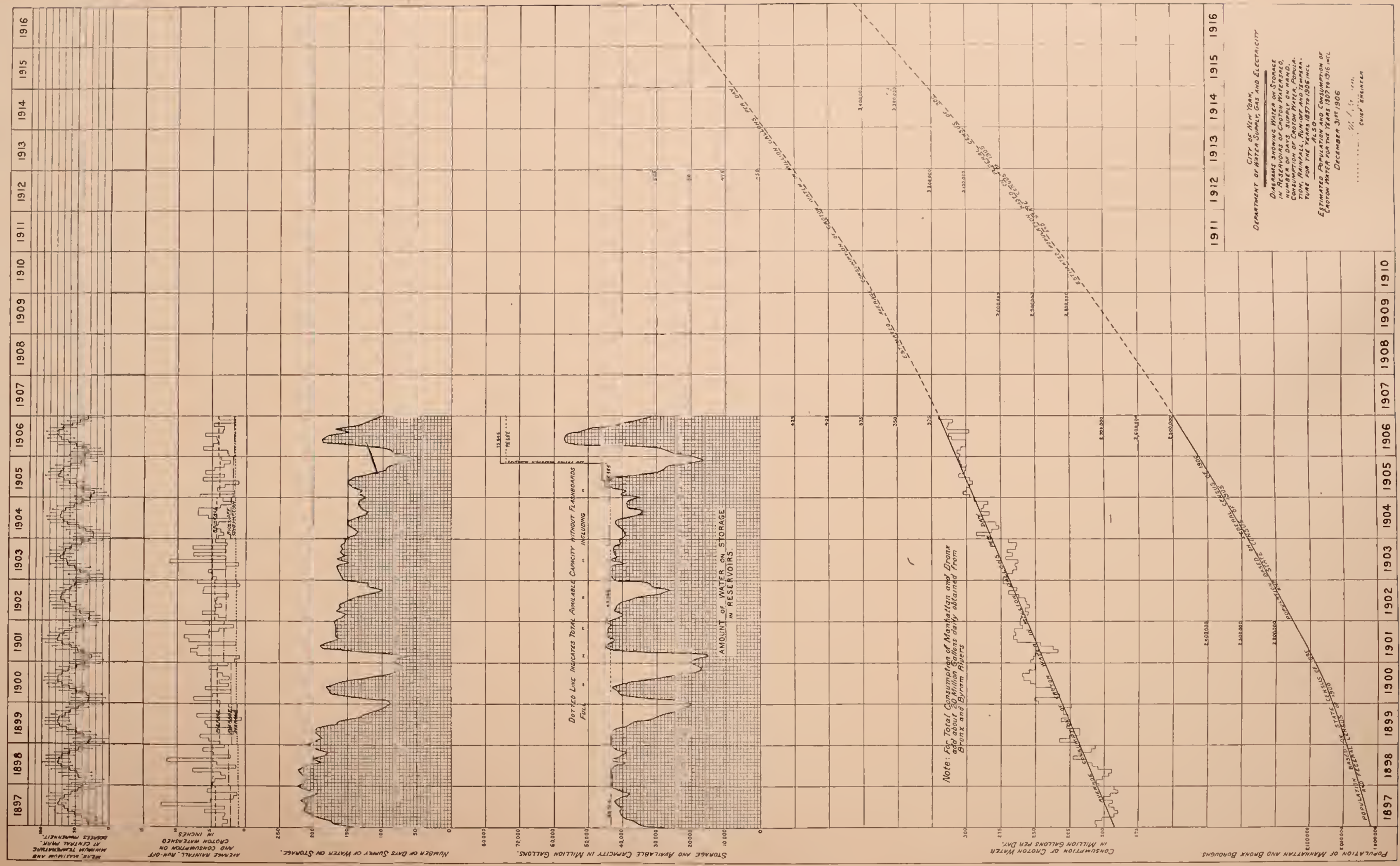
Third—The proper meter rate to apply so that the tenants when their fixtures were in good order would not pay more for the metered water than they had been paying before the installation of the meters.

Both the advocates and opponents of the installation of meters would have facts before them to arrive at a practical and intelligent solution of this long vexed question, instead of continuing, as heretofore, what has been little better than a purely academic discussion.

In regard to the house to house inspection, reference was made to the results obtained by this method in Brooklyn in times of emergency, which resulted in a considerable reduction in consumption and particular mention was made of the reports for Brooklyn of 1902 and 1905, dealing with this question. The following extract from this report was inserted:

Inspection was made of the district bounded approximately as follows:

Nostrand avenue, Myrtle avenue, Washington street, East River, Navy Yard and Flushing avenue.


CITY OF NEW YORK,
DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY
DIAGRAMS SHOWING WATER ON STORAGE IN RESERVOIRS AND LAKES, NUMBER OF DAYS SUPPLY ON HAND, CONSUMPTION OF CROTON WATER, POPULATION, RAINFALL, RUN-OFF AND TEMPERATURE FOR THE YEARS 1857 TO 1906 INCL.
ALSO
ESTIMATED POPULATION AND CONSUMPTION OF CROTON WATER FOR THE YEARS 1907 TO 1916 INCL.
DECEMBER 31ST 1906
CHIEF ENGINEER
1911 1912 1913 1914 1915 1916
1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910
POPULATION OF MANHATTAN AND BRONX BOROUGHS.
CONSUMPTION OF CROTON WATER IN MILLION GALLONS PER DAY.
Note: For Total Consumption of Manhattan and Bronx add about 20 Million Gallons daily obtained from Bronx and Byram Rivers
STORAGE AND AVAILABLE CAPACITY IN Million GALLONS.
Dotted Line Indicates Total Available Capacity Without Flashboards
Full " " " " Including "
AMOUNT OF WATER ON STORAGE IN RESERVOIRS.
NUMBER OF DAYS SUPPLY OF WATER ON STORAGE.
AVERAGE RAINFALL, RUN-OFF AND CONSUMPTION ON CROTON WATERSHED IN INCHES
MEAN, MAXIMUM AND MINIMUM TEMPERATURE AT CENTRAL PARK. DEGREES FAHRENHEIT.

This district covered a little over 6,000 buildings, the majority being low class flat houses, the population being mainly of foreign birth. The results of the inspection showed the following leaks from defective plumbing:

Water closets	426
Taps	384
Total	810

The leakage as estimated by the Inspectors from inspection only, amounted to:

From water closets, gallons per twenty-four hours	211,000
Taps, gallons per twenty-four hours	155,000
Total	366,000

The Inspectors also report that they found considerable waste due to carelessness, or design, of tenants in opening cocks and permitting the water to run to waste. In these cases the tenants were cautioned and the waste stopped. The leakage from this source, plus that covered by the defective plumbing, should bring the total estimated waste not far from 500,000 gallons per day for this district. This district covers an area of 0.91 square mile.

A method which has been adopted in other places of having a fine imposed for every leaky fixture, might have a beneficial effect in making each property owner his own Inspector and the fines thus imposed would help to pay for the cost of this inspection, thus placing the burden of this inspection on the property owners who were not careful in preventing leakage, instead of on the City as a whole. The results of this inspection certainly warrant the continuation of the work in the spring, and an appropriation will be asked for the necessary men to systematically continue the water waste investigation.

The annual salaries of the men required to carry on this question was estimated as follows:

For Manhattan and The Bronx	$39,550 00
For Brooklyn	26,150 00
—making a total of	$65,700 00

In each case the details of all the above estimates were given.

On November 23, 1906, you forwarded copy of the above report to the Board of Estimate, discussing and endorsing its conclusions and forwarded also and recommended the adoption of the resolutions authorizing the necessary appropriations to carry out the provisions of the Act. No action, however, on that recommendation has yet been taken. It is to be hoped that the necessary funds may be granted in the

near future, so that the preliminary data required to install meters throughout the City and determining the proper rates to be charged, shall be secured. The results to be accomplished will more than warrant the expense to be incurred. As a measure of safety, the installation of meters should no longer be delayed in order to reduce the consumption as much as possible, in view of the imminent shortage of water to be feared in our City long before the completion of the work required to bring an additional supply from the Catskills, and which has been so repeatedly brought to the attention of our municipal authorities in the past.

Croton Watershed, Maintenance and Repairs.

Division No. 1.

The work on this division has been: Painting iron fence along the road in front of the new gatehouse and at the intake of the new aqueduct; also all the ironwork in the screen and sump chambers and stairs in new gatehouse has been painted; more than four miles of lake shore cut and cleaned of grass and weeds, two miles of the old aqueduct south of the new dam cleaned of weeds, leaves, brush, etc. A building 10 feet square was moved from below the new dam to top of the hill at dam for use as a telephone house. Screens rebuilt and all the screens in the new gatehouse cleaned, and the screws in the new gatehouse and in gatehouse No. 1 at the new dam cleaned and oiled; shores of the lake patrolled and all nuisances removed. Collecting samples of water for the Mt. Kisco Laboratory.

Division No. 2.

The work on this division has been: Cleaning up line of old aqueduct and the new aqueduct at shaft sites; cleaning culverts, gutters and crosswalks of ice and snow; rebuilt two road bridges on the upper end of the division; reset bluestone walk and curb, also reset brick walk; repaving gutters, cleaning stopcock vault in Spring street and regulated the flow of water from the aqueduct into the Sing Sing Prison reservoir; hauling cement and sand and posts; setting and resetting telephone poles and putting cross arms on same; building dry stone fence walls; filling and grading on aqueduct banks.

Division No. 3.

The work on this division has been: Building concrete wall on the east side of the Pocantico gatehouse, using 108 cubic yards of concrete, with all the necessary excavating and refilling for the same. The building of this wall was made necessary for reinforcement and to prevent leaking. Cleaning culverts, drains and crosswalks and cleaning up line of aqueduct.

Division No. 4.

The work on this division has been: Building and repairing fences, filling and grading on aqueduct banks, cutting fence posts and setting telephone poles, trimming trees on aqueduct where they interfered with telephone wires, cleaning crosswalks, culverts, drains and gutters, cleaning up line of aqueduct.

Division No. 5.

The work on this division has been: Building, repairing and painting fences; taking down old telephone poles, trimming and setting new telephone poles; filling and grading on aqueduct banks; cleaning snow and ice from sidewalks. Cleaning gutters, culverts and drains and line of aqueduct.

Division No. 6.

The work on this division has been: Building and repairing fences and fence gates; setting telephone poles; cleaning gatehouse and shaft 20 every day; cleaning machinery in gatehouse; cleaning culverts, gutters, drains and crosswalks of ice and snow; filling and grading on aqueduct banks; cleaning line of aqueducts.

Division No. 7.

The work on this division has been: Redressing stonework and repairing brickwork; also repairing gutters; hoisting and trimming coal; cleaning drains, gutters and crosswalks of ice and snow; cleaning up line of aqueduct, bridge and steps leading to High Bridge.

Division No. 8.

The work on this division has been: Painting iron fence at Ninety-second and Ninety-third streets and all iron doors of gate chambers and gatehouses; cleaning screens at One Hundred and Thirty-fifth street and south gatehouses; cutting grass at new reservoir; repairing flag walk at south gatehouse; painting gatehouses at old reservoir; whitewashing south gatehouse chambers and pipes, and oil chamber and pipes, and Sixth avenue chamber and pipes; painted cellar of Keeper's house with cold water paint; keeping surface of water clean; cleaning and maintenance of gatehouses, cleaning screens at Ninety-second, Ninety-third, One Hundred and Thirteenth, One Hundred and Nineteenth streets and south gatehouses. Patrolling Central Park reservoir and pipe lines.

Boyds Corners Reservoir.

The work at this reservoir has been: Cutting grass and weeds on the embankments of the dam and on lands below the dam; cleaning up along the shores of the reservoir; rebuilding stone wall fence; cleaning face of masonry dam at Boyds Corners; cleaning gatehouses, gates and stopcocks; collecting samples of water for the laboratory and patrolling reservoir and streams.

West Branch Reservoir.

The work at this reservoir has been: Building and repairing fences; repairing roads and riprap masonry; removed and stored the flashboards from West Branch Reservoir; rebuilt stone wall fence; cleaning gatehouses and machinery; cutting weeds and grass; collecting samples of water for the laboratory and patrolling reservoir and streams.

Middle Branch Reservoir.

The work on this division has been: Rebuilding stone wall fences; repairs to roads and riprap masonry; replanking and repairing bridges; cleaning culverts; removed and stored the flashboards from the Middle Branch Reservoir; cleaning gatehouses and machinery; collecting samples of water for the laboratory and patrolling reservoirs and streams.

East Branch Reservoir.

The work at this reservoir has been: Building and repairing fences; rebuilt stone wall fence; cleaning gatehouse and machinery; cutting weeds and grass; collecting samples of water for the laboratory; patrolling reservoirs and streams.

Lake Gleneida.

The work at this lake has been: Building dry stone wall at outlet of lake; painting fences and collecting samples of water for the laboratory; patrolling lake and streams.

Kirk Lake.

The work at this lake has been: Building fences between property of The City of New York and adjoining owners; rails and posts cut on property where the fence is built; collecting samples of water for the laboratory and patrolling lake and streams.

Electrozone Plant.

The electrozone plant has been operated during the quarter. A small house has been erected to house the pump near Tonetta Brook; pump placed and pipes connected so as to get a supply of water for the plant, other sources of supply having failed. Cleaned out the tile trench and horseshoe tile and relaid same and filled in the trench; cleaned out receiving vault in electrozone field and removed the material from same; carted earth and gravel on electrozone field; put new cover on receiving vault; hauling salt from railroad to electrozone plant.

Titicus Reservoir.

The work at this reservoir has been: Building and repairing fences and repairing stone fence wall; also repairing culverts; cutting grass, weeds and brush along the margins of the reservoir; in drawing down the reservoir a large area of land has been exposed upon which a rank growth of grass and weeds sprung up; this has been cut and burned; cleaning gatehouses and machinery; collecting samples of water for the laboratory and patrolling reservoir and streams; removing and storing flashboards.

Muscoot Reservoir.

The work at this reservoir has been: Repairing stone fence wall and culverts; cutting and burning of brush, grass, weeds, etc., along the Muscoot River, above Muscoot Reservoir; cleaning gatehouses and machinery; collecting samples of water

for the laboratory and patrolling reservoir and streams; removing and storing flashboards.

Bronx River Division.

The work on this division has been mainly cutting brush and burning same, from a strip 25 feet wide each side of the Bronx River and for a distance of about 16,000 feet; also cleaning and straightening the channel of same for a distance of about 2,000 feet. Along the Byram River the brush has been cut and burned from a strip 25 feet wide on each side of the stream for a distance of 4,000 feet; also the channel of the Byram has been cleaned and straightened and the banks sloped on both sides for a distance of 2,000 feet. The low stage of the water in the Byram River during the quarter has enabled us to remove from below the flow line about sixty stumps, thus clearing about one-half its basin.

The Watchmen and Patrolmen have given their constant care and attention to preserving as far as possible the purity of the water of the reservoirs and streams.

During the quarter, in order to perform necessary work in connection with Jerome Park Reservoir and also to test the flow, the new aqueduct was shut down on the following dates:

October 1—Twenty-four hours.

November 12—Twenty-one hours.

November 19—Fifteen hours.

The work at the Pocantico gatehouse, commenced during the third quarter, was completed during the last quarter.

	Aqueduct Division.		
	No. 1.	No. 2.	No. 3.
Earth excavated, cubic yards	11		625
Dry stone masonry, cubic yards	10	21	
Dry stone fence wall built, cubic yards			
Dry stone fence wall repaired and rebuilt, cubic yards		81	
Rip-rap masonry, cubic yards			
Filling and grading, cubic yards	90	132	
Broken stone spread, cubic yards			
Concrete and brick masonry, cubic yards		8	108
Pointing masonry, square feet		2,158	
Pointing coping, linear feet	65		
Sewer laid, linear feet	54	14	
Bluestone curbing reset, linear feet		258	
Bluestone walk reset, square feet		852	
Brick wall reset, square feet		528	
Concrete walk laid, square feet			
Gutter repaired and repaved, square feet		656	
Slope paving repaired, square feet			
Culverts repaired			
Cement flooring laid, square feet		294	
Catch basins built	1		
Sloping river banks, square feet			
Material removed, receiving vault, cubic yards			
Hauling earth, sand and gravel, cubic yards		13	
Planking bridge, square feet			
Sodding, square yards			
Manure spread, loads			
Shed for brick built		1	
Wire screens rebuilt	24		
Road bridges built		7	
Fence gates built		4	

River Works—Maintenance and Repairs.

Aqueduct Division.					Putnam County Division.	Westchester County Division.	Bronx River Works.	Total.
No. 4.	No. 5.	No. 6.	No. 7.	No. 8.				
40	324	393		100				1,493
....	131	10			48			220
....					114			114
....					4,766	392	68	5,307
....					64		2,100	2,164
80	130	75			739			1,246
....					2			2
....	1	30	24	7				178
....			160				75	2,393
....								65
....								68
....								258
....	340		657	1,200				3,049
....								528
....	500			195				695
....	22		846					1,524
....					1,200			1,200
....						12		12
....								294
....								1
....							50,000	50,000
....					95			95
26	32				25			96
....					900			900
....					1,161			1,161
....	16							16
....								1
....								24
....								7
....		7	1			1		13

	Aqueduct Division.		
	No. 1.	No. 2.	No. 3.
Fence gates repaired		5	
Fence built, linear feet		2,144	6,047
Fence repaired, linear feet		1,433	1,147
Fence painted, linear feet	870	4,205	1,549
Fence posts cut and trimmed	200	240	130
Fence posts hauled		208	
Telephone poles hauled		145	
Telephone poles peeled of bark			
Telephone poles set		9	
Telephone poles reset		53	6
Telephone cross arms set		30	
Brick hauled		1,300	

Aqueduct Division.					Putnam County Division.	Westchester County Division.	Bronx River Works.	Total.
No. 4.	No. 5.	No. 6.	No. 7.	No. 8.				
....						4		9
2,736	1,571	1,130	20		13.951	500		28,099
2,540	686	1,800	400		16,111	3,205		27,322
2,045	2,550	460	30	1,140	1,358			14,207
100					1,100			1,770
....								208
20	76	90						331
50								50
125	105	20						259
....								59
....								30
....								1,300

Analytical and Biological Work Performed.

Mt. Kisco Laboratory.

The force at Mt. Kisco Laboratory now consists of one Bacteriologist, two Laboratory Assistants and two Laborers. Since January 1, 1906, the entire water examinations for Manhattan and The Bronx, except for the distributing systems, have been made at Mt. Kisco Laboratory. Heretofore a large part of this work had been carried on at Mt. Prospect Laboratory, Brooklyn.

Collection of Samples.

The schedule for the collection of samples of water for analysis has been practically as follows:

Daily samples have been collected from the terminus of the Croton Aqueduct at the One Hundred and Thirty-fifth street gatehouse, and at a tap in City Hall square. These samples have been analyzed physically and bacteriologically. Chemical, microscopical and bacteriological analyses have been made on weekly samples collected from the outlets of the distribution reservoirs in Central Park, at High Bridge and at Jerome Park; from the Williamsbridge reservoir; from the One Hundred and Thirty-fifth street gatehouse, and from a tap in City Hall square. All of the above samples have been sent to Mt. Prospect Laboratory, in Brooklyn. Weekly samples have been collected from all the storage reservoirs on the Croton watershed, from a number of places on the Croton River and its tributaries, and from the reservoirs of the Bronx and Byram systems. These samples have been sent to the branch laboratory at Mt. Kisco, and examined bacteriologically and physically, and on alternate weeks microscopical examinations have been made. Once a month complete analyses have been made upon samples from these reservoirs. Complete analyses have also been made upon weekly samples from several points on Croton Lake, especially at the intake. Samples have been collected from the ground water supplies in the Boroughs of Queens and Richmond as often as once a month or once a quarter (as occasion seemed to require), and given a complete sanitary analysis at Mt. Prospect Laboratory.

Analytical Work on Water.

The following figures give the amount of work which has been done at Mt. Prospect and Mt. Kisco Laboratories during the year 1906:

Total Samples of Water Analyzed by Laboratories.

Mt. Prospect Laboratory	2,061
Mt. Kisco Laboratory	3,542
Total	5,603

Total Samples of Water Analyzed, by Boroughs.

Manhattan	4,253
Queens	769
The Bronx	520
Richmond	61
Total	5,603

Physical examinations	2,908
Complete chemical analyses	882
Partial chemical analyses	1,379
Microscopical examinations	2,095
Bacteriological examinations	4,618
Bacteriological tests for baccillus coli	4,686

General Analytical Work.

The following table gives an idea of the general analytical work during the year:

Oil samples examined	51
Coal samples examined	37
Metals and alloys	18
Packing	17
Sand	9
Cement	5
Mineral analyses of water, complete	2
Mineral analyses of water, partial	41
Special tests and experiments	110

Reports.

During the year 1906, 147 special reports have been made on the quality of the numerous sources of supply, and on oil, coal and the various constructional materials used in the Department for the Boroughs of Manhattan, The Bronx, Queens and Richmond.

Special tests have been made in connection with changes in the sewerage and drainage at Mt. Kisco, and at the Montefiore Home, and studies have been made in relation to the determination of the presence of B. coli in water; of the amount of lime in water; on the removal of algae and intestinal germs from water supplies by the copper sulphate treatment; and on the various methods for the purification of drinking water.

From the Mt. Kisco Laboratory weekly reports have been made on the quality of the water in the distributing system for Manhattan and The Bronx.

Quality of the Water.

BOROUGH OF MANHATTAN.

The following table gives a comparison of the average quality of the high service and low service waters supplied to the Borough of Manhattan for the years 1905 and 1906:

	One Hundred and Thirty-fifth Street Gatehouse.		Tap in City Hall Square.	
	1905.	1906.	1905.	1906.
Physical Examination.				
Turbidity	5.000	8.000	4.000	7.000
Color	26.000	24.000	23.000	21.000
Per cent. of samples with distinct vegetable odors	0.600	8.300		0.900
Per cent. of samples with odors of decomposition	1.100	2.300	0.300	2.600
Per cent. of samples with odors due to organisms	0.900	6.000	0.600	4.300
Chemical Examination.				
Albuminoid ammonia	0.174	0.167	0.126	0.138
Free ammonia	0.061	0.054	0.017	0.014
Nitrites	0.003	0.005	0.003	0.003
Nitrates	0.070	0.130	0.080	0.170
Total solids	73.000	78.000		
Chlorine	1.800	2.100		
Hardness	38.000	40.000		
Alkalinity	35.000	37.000		
Iron	0.410	0.390		
Microscopical Examination.				
Microscopic organisms	599	1,005	450	991
Amorphous matter	419	897	180	577
Bacteriological Examination.				
Bacteria, per c. c.	2,337	2,084	454	521
Per Cent. of Positive Tests for B. Coli—				
In 0.1 c. c.	4.300	2.900	1.400	1.100
In 1 c. c.	16.000	13.500	5.700	3.500
In 10 c. c.	32.700	47.500	16.400	26.300

The accompanying diagram (Plate No. 3) shows the daily fluctuations in the quality of the water during the year 1906, and on the accompanying sheets will be found the results of analyses of the various sources of supply for the Borough of Manhattan.

The analyses of the Croton water supply have shown from year to year a gradual deterioration in the quality of the water. The usual high color has been maintained,

and the turbidity and microscopic growths have increased in amount. Besides the increase in color, turbidity and microscopic growths, the water has also shown deterioration from a sanitary standpoint. A gradual increase in pollution has been noted in the weekly reports from the Department Laboratory at Mt. Kisco.

These reports give the analyses of each individual reservoir, lake and important stream on the entire watershed, and form an exact gauge as to sanitary conditions.

The following table shows the great increase in microscopic organisms in Croton Lake during the last four years. The figures beginning with September, 1906, are lower than those for the preceding months on account of treatment with copper sulphate of the lower portion of Croton Lake. These samples were taken at the surface of the old dam.

Monthly Averages of Microscopic Organisms in Croton Lake.

Month.	Average Microscopic Organisms.			
	1903.	1904.	1905.	1906.
January		251	137	135
February	248	145	155	368
March	279	135	93	170
April	967	690	485	464
May	812	1,310	1,034	824
June	447	1,197	1,150	658
July	1,447	877	1,324	1,867
August	447	1,250	1,082	3,303
September	496	785	1,810	811
October	1,165	1,195	1,655	704
November	591	247	1,369	940
December	284	305	681	539

BOROUGH OF THE BRONX.

The following tables give the comparative average analyses of the Willamsbridge Reservoir for the years 1905 and 1906:

	Inlet.		Outlet.	
	1905.	1906.	1905.	1906.
Williamsbridge Reservoir.				
Physical Examination—				
Turbidity	5.000	7.000	6.000	7.000
Color	24.000	18.000	25.000	17.000

	Inlet.		Outlet.	
	1905.	1906.	1905.	1906.
Physical Examination—				
Per cent. of samples with distinct vegetable odors		1.900		1.900
Per cent. of samples with odors of decomposition		1.900	1.900	1.900
Per cent. of samples with odors due to organisms				
Chemical Examination—				
Albuminoid ammonia	0.145	0.118	0.124	0.123
Free ammonia	0.046	0.029	0.025	0.038
Nitrites	0.003	0.003	0.003	0.004
Nitrates	0.050	0.100	0.050	0.090
Total solids	65.000	64.000		
Chlorine	2.300	2.500		
Hardness	31.000	31.000		
Alkalinity	26.000	27.000		
Iron	0.240	0.290		
Microscopical Examination—				
Microscopic organisms	123	835	177	775
Amorphous matter	350	331	348	420
Bacteriological Examination—				
Bacteria, per c. c.	406	348	383	274
Per cent. of positive tests for B. coli:				
in 0.1 c. c.	1.900			
in 1 c. c.	7.700	3.700	7.700	
in 10 c. c.	13.500	25.900	11.500	15.100

The table shows that the water supplied to the Bronx Borough is of good quality and practically the same as that delivered during the previous year, except for microscopic growth.

On the accompanying sheet will be found the results of analyses of the reservoirs on the watershed of the Bronx and Byram Rivers.

A considerable increase in typhoid fever occurred in that portion of The Bronx in the neighborhood of One Hundred and Sixty-eighth street and Third avenue. This matter was investigated by our Department and samples of water from the houses in which the cases occurred were examined and found to be above suspicion, showing that the disease was contracted from sources other than the water supply.

BOROUGH OF QUEENS.

The accompanying sheet gives the average analyses of the various waters supplied to the Borough of Queens during the year 1906.

All of the water delivered to this Borough is from driven wells, except a portion of the Flushing water supply. Owing to the use of the new well system at the Flushing Pumping Station, very little surface water has been used during the year.

The Long Island City Pumping Station No. 2 has been rebuilt, and analyses of weekly samples from this source have been made. The amount of chlorine has so far not risen above fifty parts per million.

A new deep well system has been established by the Citizen's Water Supply Company, at Douglaston, Long Island, from which a water of particularly good quality and of very low mineral content is obtained.

Daily analyses of chlorine have been made during the year of the water from the North Beach Pumping Station, and these results have been reported weekly. The amount of salt contained in this water has averaged rather high, and owing to the very corrosive nature of the minerals which come from infiltration of sea water into these wells, it is recommended that this water be discontinued for use as soon as it can be replaced.

The other sources of supply for this Borough are entirely satisfactory, as will be seen by an examination of the analyses given on the accompanying blank.

BOROUGH OF RICHMOND.

The average results of the analyses of water from the various sources of supply for the Borough of Richmond during the year 1906 are given in the accompanying table. The figures do not vary materially from those of the preceding year.

The water supplied by the West New Brighton Pumping Station of the Staten Island Water Supply Company is at times of poor quality, due to the fact that in periods of drought a polluted stream in the neighborhood is drawn upon. A comparison of the B. coli results in the analyses of the stream and of the tap samples taken at Port Richmond, which is supplied by the West New Brighton Pumping Station, brings out this fact very clearly. This water is also very high in mineral matter, due to the infiltration of sea water. The other sources of supply, although containing considerable lime and magnesia, are otherwise of very good quality.

MT. PROSPECT
Croton Watershed,

Place of Collection.	Physical Examination.			Chemical Analysis					
				Nitrogen as					
				Albuminoid Ammonia.					
	Turbidity. (Parts per Million of Silica.)	Color. (Parts per Million of Platinum.)	Odor.	In Solution.	In Suspension.	Total.	Free Ammonia.	Nitrites.	Nitrates.
White Lake	3	12	..	.132	.037	.167	.019		.03
Boyds Corner Reservoir, surface	3	38	..	.106	.026	.128	.003	.001	.09
Boyds Corner Reservoir, bottom	2	38	..	.071	.017	.083	.003		.06
Lake Gleneida	3	9	..	.098	.024	.119	.006	.001	.02
West Branch Reservoir, surface	5	22	..	.109	.032	.141	.020	.001	.07
West Branch Reservoir, bottom	6	23	..	.102	.036	.138	.032	.002	.05
Lake Gilead	3	9		.088	.020	.108	.007	.001	.02
Middle Branch Reservoir, surface	7	25	..	.118	.043	.161	.014	.001	.05
Middle Branch Reservoir bottom	5	32	..	.118	.043	.161	.065		.03
Kirk Lake	7	29	..	.156	.057	.213	.032	.001	.06
Lake Mahopac	3	10	..	.093	.063	.156	.004	.001	.03
East Branch Station at De Forests Corners	6	32	..	.152	.044	.182	.019	.001	.08
Sodom Reservoir, surface	5	27	..	.106	.041	.147	.022	.001	.07
Sodom Reservoir, bottom	8	29	..	.114	.048	.162	.026	.002	.09
Bog Brook Reservoir, surface	5	17	..	.103	.034	.137	.022	.001	.06
Bog Brook Reservoir, bottom	7	17	..	.113	.057	.170	.023	.002	.08
East Branch Station, above Tonetta Brook	7	34	..	.145	.044	.189	.030	.001	.09
East Branch Station, Below Tonetta Brook	19	44	..	.152	.041	.193	.023	.002	.20
Tonetta Brook	34	46	..	.120	.015	.135	.011	.002	.72
Titicus River, above North Salem	7	30	..	.153	.049	.193	.020	.001	.11
Titicus River, at dam	6	30	..	.144	.030	.178	.021	.001	.16
Titicus River, below North Salem	6	31	..	.172	.047	.219	.019	.001	.11
Titicus Reservoir, surface	5	29	..	.108	.041	.147	.019	.001	.05
Titicus Reservoir, bottom	5	27	..	.105	.042	.147	.050	.001	.10
West Branch, Croton River	5	9	..	.140	.069	.209	.115	.002	.93
Middle Branch, Croton River	5	9	..	.114	.062	.176	.099	.001	.58
Croton River at Titicus	6	31	..	.116	.027	.143	.028	.002	.10
Muscoot Reservoir, surface	6	20	..	.143	.042	.185	.107	.001	.10
Muscoot Reservoir, bottom	7	24	..	.093	.022	.116	.127	.002	.22
Branch Brook at Lexington avenue	5	26	..	.073	.014	.084	.055	.007	1.56
Kisco River, at West Main street	5	27	..	.072	.018	.085	.014	.003	.38

LABORATORY.

Averages, 1906.

(Parts per Million).								Bacteriological Examination.				Microscopical Examination. Number of Standard Units per c. c.		
									B. Coli					
Total Solids.	Suspended Solids.	Loss on Ignition.	Fixed Solids.	Chlorine.	Hardness.	Alkalinity.	Iron.	Number of Bacteria per c. c. 4 Hours at 20° C.	In 0.1 c. c., %	In 1.0 c. c., %	In 10 c. c., %	Total Microscopic Organisms.	Amorphous Matter.	
42	..	15	27	1.8	17.2	12.6	.06	210	1.9	5.8	13.5	350	..	
60	..	22	38	1.3	25.8	20.9	.09	689	...	5.8	21.2	232	..	
55	..	21	34	1.1	25.4	21.2	.05		...	...	...	138	..	
73	..	23	50	3.5	40.9	39.6	.06	296	...	...	11.5	256	..	
53	..	19	34	1.4	23.3	19.1	.08	262	1.9	3.8	9.6	795	..	
55	..	21	34	1.5	21.8	18.8	.05		...	...	...	454	..	
47	..	15	32	1.9	23.6	10.9	.05	375	2.0	4.0	18.0	114	..	
62	..	19	43	1.7	28.0	22.6	.10	1,221	...	3.8	13.5	882	..	
64	..	18	46	1.6	30.9	26.0	.15		...	...	...	437	..	
70	..	24	46	1.7	33.5	29.5	.07	689	...	5.8	27.0	1,167	..	
47	..	19	28	2.6	21.4	17.5	.05	772	1.9	3.8	7.7	696	..	
115	..	33	82	2.3	69.2	62.6	.11	2,358	9.6	25.0	59.6	485	..	
85	..	28	58	2.0	48.7	38.3	.16	1,219	1.9	5.8	9.6	734	..	
86	..	28	58	1.8	47.8	44.4	.46		...	...	...	698	..	
87	..	30	57	1.9	48.3	44.0	.21	674	1.9	7.7	19.2	599	..	
90	..	29	61	1.8	47.8	43.3	.43		...	...	...	650	..	
99	..	28	70	2.4	58.9	55.1	.19	1,463	19.2	51.9	57.7	556	..	
103	..	28	75	2.3	57.1	49.1	.20	2,376	28.9	59.6	76.9	457	..	
131	..	40	91	6.1	59.8	49.0	.24	4,821	42.3	61.6	73.3	144	..	
155	..	34	101	2.9	80.3	74.3	.21	5,191	29.4	48.1	62.7	56	..	
127	..	33	94	2.9	78.0	73.7	.17	4,222	21.5	56.9	78.4	90	..	
129	..	31	98	2.9	79.2	73.5	.17	3,782	17.3	42.3	67.3	87	..	
79	..	26	53	2.2	45.1	40.4	.11	984	...	3.8	24.5	1,078	..	
83	..	23	60	2.1	45.0	42.0	.24	1,756		3.8	22.7	735	..	
73	..	22	51	2.3	28.4	17.2	.10	1,031	1.9	24.5	52.9	42	..	
64	..	18	46	2.1	23.7	16.1	.09	1,570	3.8	11.5	41.7	50	..	
82	..	26	56	2.3	44.8	38.1	.19	2,275	7.5	32.1	64.2	555	..	
74	..	24	50	2.2	41.3	36.0	.12	931	1.9	3.8	15.1	830	..	
76	..	26	50	2.6	41.3	37.0	.19	286	1.9	5.7	19.0	429	..	
150	..	48	102	8.3	78.1	65.3	.13	3,817	40.4	63.4	86.5	49	..	
96	..	27	69	4.0	52.4	43.6	.16	4,419	45.0	56.7	82.7	87	..	

MT. PROSPECT

Croton Watershed.

Place of Collection.	Physical Examination.			Chemical Analysis					
				Nitrogen as					
				Albuminoid Ammonia.					
	Turbidity. (Parts per Million of Silica).	Color. (Parts per Million of Platinum.)	Odor.	In Solution.	In Suspension.	Total.	Free Ammonia.	Nitrites.	Nitrates.
Montefiore Home—									
Raw sewage	..	..	..	4.0	3.5	7.5	24.0	.004	.14
Effluent No. 1.....	..	..	..	4.3	3.9	8.2	22.9	.021	.87
Effluent No. 2.....	..	..	..	1.6	2.5	4.1	26.0	.014	.14
Montefiore Home Brook, below trenches	..	..	..						

Place of Collection.	Physical Examination.			Chemical Analysis					
				Nitrogen as					
				Albuminoid Ammonia.					
	Turbidity. (Parts per Million of Silica.)	Color. (Parts per Million of Platinum.)	Odor.	In Solution.	In Suspension.	Total.	Free Ammonia.	Nitrites.	Nitrates.
Cross River, at Katonah..	6	28	..	.109	.033	.117	.011	.001	.16
Croton Lake, head.....	10	32	..	.177	.031	.208	.052	.002	.15
Croton Lake, Pines Bridge	11	21	..	.171	.057	.228	.041	.002	.15
Croton Lake, old lake, surface	9	28	..	.123	.052	.175	.018	.002	.12
Croton Lake, old lake, old aqueduct	11	26	..	.113	.054	.167	.032	.001	.16
Croton Lake, old lake, bottom	11	29	..	.126	.037	.163	.078	.002	.15
Croton Lake, new lake, surface	6	25	..	.123	.072	.195	.013	.001	.11
Croton Lake, new lake, 20 feet	4	24	..	.085	.044	.129	.009	.001	.16
Croton Lake, new lake, 30 feet	8	23	..	.090	.030	.120	.014	.002	.21
Croton Lake, new lake, bottom	3	22	..	.065	.036	.101	.026	.001	.18
Cornell Dam, surface....	5	22	..	.142	.069	.211	.019	.001	.08
Cornell Dam, 20 feet....	3	22	..	.094	.055	.149	.021	.001	.15
Cornell Dam, 40 feet....	2	21	..	.077	.070	.147	.016		.16
Cornell Dam, bottom....	3	22	..	.065	.036	.101	.026	.001	.18

LABORATORY.

Averages, 1906.

(Parts per Million).								Bacteriological Examination.					
									B. Coli				
Total Solids.	Suspended Solids.	Loss on Ignition.	Fixed Solids.	Chlorine.	Hardness.	Alkalinity. *	Iron.	Number of Bacteria per c. c. 48 Hours at 20° C.	In .001 c. c., %	In .01 c. c., %.	In .1 c. c., %.	In 1.0 c. c., %.	In 10. c. c., %.
327	..	135	192	33.8			.46	1,309,013	67	96	100	100	100
300	..	103	197	36.3			1.37	802,922	55	91	100	100	100
328	..	108	220	38.7			1.81	695,244	56	88	100	100	100
...	..	...	...					2,803	..	..	16	39	67

(Parts per Million).								Bacteriological Examination.				Microscopical Examination. Number of Standard Units per c. c.	
									B. Coli				
Total Solids.	Suspended Solids.	Loss on Ignition.	Fixed Solids.	Chlorine.	Hardness.	Alkalinity.	Iron.	Number of Bacteria per c. c. 48 Hours at 20° C.	In 0.1 c. c., %.	In 1.0 c. c., %.	In 10. c. c., %.	Total Microscopic Organisms.	Amorphous Matter.
81	..	24	57	2.6	40.1	36.7	.17	1,461	9.6	42.3	75.0	106	..
87	..	27	60	2.4	41.6	37.1	.25	2,285	3.8	34.3	63.8	742	..
82	..	27	55	2.3	42.2	38.0	.22	2,449	...	8.3	37.3	1,033	..
76	..	24	52	2.3	39.8	35.6	.18	2,714	7.8	17.2	56.3	837	..
73	..	23	50	2.2	36.3	32.4	.17	8,986	2.0	16.3	26.5	628	..
80	..	24	56	2.2	41.5	36.5	.21	2,723	7.1	29.2	61.4	537	..
71	..	23	48	2.1	39.5	34.9	.08	1,102	1.7	11.7	43.3	1,076	..
70	..	22	48	2.1	39.4	32.4	.09	3,929	4.5	4.5	42.9	664	..
75	..	20	55	2.1	36.2	29.0	.19	6,100	...	...	40.0	821	..
64	..	18	46	2.1	35.0	28.2	.06	1,087	3.4	10.4	31.0	275	..
73	..	26	47	2.1	37.8	35.5	.06	783	...	6.0	36.0	1,170	..
66	..	22	44	2.1	37.1	30.3	.06	1,373	...	8.0	32.0	623	..
70	..	20	50	2.1	37.7	30.1	.06	2,022	4.0	16.0	36.0	435	..
64	..	18	46	2.1	35.0	28.2	.06	1,087	3.4	10.4	31.0	275	..

MT. PROSPECT

Bronx and Byram Water

Place of Collection.	Physical Examination.			Chemical Analysis					
				Nitrogen as					
				Albuminoid Ammonia.					
	Turbidity. (Parts per Million of Silica.)	Color. (Parts per Million of Platinum.)	Odor.	In Solution.	In Suspension.	Total.	Free Ammonia.	Nitrites.	Nitrates.
Byram Reservoir	5	16	..	.142	.039	.181	.065	.002	.10
Wampus Pond.....	3	15	..	.110	.028	.138	.001	.001	.03
Rye Pond	5	16	..	.128	.047	.173	.007	.001	.20
Kensico Reservoir, surface	5	19	..	.100	.043	.143	.017	.001	.50
Kensico Reservoir, bottom	6	22	..	.105	.034	.139	.027	.001	.70

MT. PROSPECT

Queens Borough,

Place of Collection.	Physical Examination.			Chemical Analysis					
				Nitrogen as					
				Albuminoid Ammonia.					
	Turbidity. (Parts per Million of Silica.)	Color. (Parts per Million of Platinum.)	Odor.	In Solution.	In Suspension.	Total.	Free Ammonia.	Nitrites.	Nitrates.
Long Island City, Stations Nos. 1 to 3....	..	..	..			.020	.047	.010	3.84
Citizens' Water Company, Nos. 1 to 6.....	..	..	..			.017	.042	.038	8.03
North Beach Pumping Station	..	..	..			.011	.006	.004	7.59
Flushing Tap	3	..	..	.015		.015	.029	.005	2.58
Whitestone Pumping Station No. 1.....	1	..	..			.008	.005	.004	5.39
Jamaica Water Supply Company, Nos. 1 and 2	1	3	..			.013	.010	.007	4.64
Woodhaven Water Company	..	..	..			.006	.006	.005	2.78
Montauk Water Company	2	..	..			.010	.017	.006	5.44
Queens County Water Company, filtered ...	..	..	..			.025	.005	.003	.06

LABORATORY.

sheds, Averages, 1906.

(Parts per Million).								Bacteriological Examination.				Microscopical Examination. Number of Standard Units per c. c.	
									B. Coli				
Total Solids.	Suspended Solids.	Loss on Ignition.	Fixed Solids.	Chlorine.	Hardness.	Alkalinity.	Iron.	Number of Bacteria per c. c., 48 Hours at 20° C.	In 0.1 c. c., %.	In 1.0 c. c., %.	In 10. c. c., %.	Total Microscopic Organisms.	Amorphous Matter.
73	..	25	48	5.2	35.3	26.5	.13	2,429	...	11.1	33.3	350	..
70	..	23	47	2.3	38.1	35.8	.07	834	...	5.7	19.1	85	..
65	..	23	42	2.5	33.6	27.5	.08	203	...	3.8	15.1	760	..
69	..	22	47	2.5	34.2	28.4	.08	357	1.9	5.6	22.6	990	..
73	..	22	51	2.5	32.0	29.1	.20		...	...		853	..

LABORATORY.

Averages, 1906.

(Parts per Million).								Bacteriological Examination.				Microscopical Examination. Number of Standard Units per c. c.	
									B. Coli				
Total Solids.	Suspended Solids.	Loss on Ignition.	Fixed Solids.	Chlorine.	Hardness.	Alkalinity.	Iron.	Number of Bacteria per c. c., 48 Hours at 20° C.	In 0.1 c. c., %.	In 1.0 c. c., %.	In 10. c. c., %.	Total Microscopic Organisms.	Amorphous Matter.
313	..	..	..	21.5	18.5	12.2	.11	153	...	...	1.2		14
295	..	..	..	15.3	17.6	11.3	.09	88	...	...	...		10
702	..	..	..	106.0	31.8	14.6	.20		...	...	...		10
119	..	35	84	6.9	5.4	3.4	.08	269	...	...	...	22	15
239	..	..	..	11.6	15.4	10.7	.03	16	...	...	...		10
148	..	..	..	10.0	7.1	3.0	.31	34	...	...	...		12
199	..	..	..	9.3	14.8	12.1	.06	89	...	...	...		5
207	..	..	..	22.1	11.4	7.5	.08	173	...	...	...		3
46	..	..	..	4.4	1.1	7	.05	8	...	...	...		..

MT. PROSPECT

Richmond Borough,

Place of Collection.	Physical Examination.			Chemical Analysis					
				Nitrogen as					
				Albuminoid Ammonia.					
	Turbidity. (Parts per Million of Silica.)	Color. (Parts per Million of Platinum.)	Odor, % m.	In Solution.	In Suspension.	Total.	Free Ammonia.	Nitrites.	Nitrates.
Staten Island Water Company—									
Bulls Head Pumping Station	..	1	..			.021	.014	.003	.31
West New Brighton, Main Pumping Station	1	2	14			.017	.009	.003	3.14
West New Brighton, Main Pumping Station	39	26	..	.135	.073	.208	.128	.006	.27
Tap Inspectors' House	4	5	..	.019		.019	.012	.004	2.63
Crystal Water Company—									
Clove Street Pumping Station	..	..	..			.005	.005	.003	.90
Reservoir	..	..	..			.005	.005	.003	.93
Grant City Pumping Station	..	..	..			.008	.004	.003	2.64
South Shore Water Company—									
New Dorp Pumping Station	..	..	..			.008	.005	.004	3.47
Municipal Plant—									
Tottenville Pumping Station	16	32	14			.008	.065	.003	.04

LABORATORY.

Averages, 1906.

(Parts per Million).								Bacteriological Examination.				Microscopical Examination. Number of Standard Units per c. c.	
									B. Coli				
Total Solids.	Suspended Solids.	Loss on Ignition.	Fixed Solids.	Chlorine.	Hardness.	Alkalinity.	Iron.	Number of Bacteria per c. c., 48 Hours at 20° C.	In 0.1 c. c., %.	In 1.0 c. c., %.	In 10. c. c., %.	Total Microscopic Organisms.	Amorphous Matter.
164	..	..	..	7.7	105	97	.17	96	...	...	...		34
436	..	..	..	115.2	190	83	.28	138	...	...	...	4	56
199	..	76	123	8.0	64	46	1.65	8,953	4.0	6.0	8.0	284	2,745
523	..	..	..	154.0	226	88	.59	191	...	1.4	7.1	11	100
133	..	..	..	6.8	141	108	.06	12	...	...	...		..
134	..	..	..	6.6	136	107	.09	12	...	...	...	4	17
172	..	..	..	9.0	135	93	.12	36	...	...	...	6	4
249	..	..	..	9.6	186	164	.11	26	...	...	...		26
198	..	..	..	8.7	151	134	1.73	24	...	...	...	49	156

Pollution at Mt. Kisco, Bedford, etc.

It is to be regretted that no progress has been made during the year to abate the sources of pollution, especially at Mt. Kisco, where they constitute a serious danger to our supply.

The maps prepared for the acquisition of land for the disposal works at Mt. Kisco were approved by the Board of Estimate and forwarded to the Law Department so that condemnation proceedings might be instituted, but on June 28 the Law Department advised us that, owing to the legislation enacted during the year, there was no law "under which these proceedings could be lawfully instituted." We are thus debarred, for the present, from taking any further steps to carry on the proposed work.

I have recommended that a bill be introduced in the Legislature to authorize the City to condemn land for sanitary purposes in the watershed, and negotiate with the various villages interested for the construction in common of a system of sewers in the Croton watershed.

At Brewsters we still maintain the Electrozone plant, which treats the sewage from that portion of the village which has sewers, but the analyses of the water of Tonetta Brook show a considerable amount of pollution from house drains and street wash that flow into the river. The low level of the land does not admit of storage, and the large amount of water in the stream would render local filtration difficult, if not impracticable.

At Carmel, Bedford, Lake Mahopac, North Salem and other villages our supply is polluted by house drainage and the wash from stables. On the feeders of Titicus Reservoir some of the sources of pollution are outside of the State, and therefore beyond our control. I have made some recommendation for the lease or acquisition of land to abate these nuisances, but have been so far unable to establish even a pan closet system in these localities.

These facts furnish additional evidence, if it were needed, of the imperative need of filtration, so often recommended before. The great deterioration of the Croton water, both from a physical and a sanitary standpoint, is clearly shown from the results of our laboratory analyses on file in our office, and the main points of which are hereinbefore given. The subject of filtration will hereafter be discussed more fully.

DISTRIBUTION SYSTEM.

BOROUGHS OF MANHATTAN AND THE BRONX.

Streets and Avenues in Which Water Mains Have Been Laid.

(R) Indicates Mains Relaid or Replacing Others.

BOROUGH OF MANHATTAN.

Twenty-inch Pipe.

Ninth avenue, from Two Hundred and First to Two Hundred and Ninth street, Broome street, from Marion street to Bowery; Bowery, from Broome to Delancey street; Delancey street, from Bowery to Cannon street.

12-inch Pipe.

Lewis street, from Grand to Houston street.

Goerck street, from Grand to Houston street.

One Hundred and Forty-ninth street, from Gerard avenue to Harlem River.

One Hundred and Fifth street, from First to Second avenue.

One Hundred and Sixth street, from First to Second avenue.

Columbia street, from Grand to Houston street.

Eighty-sixth street, from Second to Fifth avenue.

Platt street, from Pearl to William street.

Amsterdam avenue, from One Hundred and Twenty-sixth street to One Hundred and Thirty-third street.

Amsterdam avenue, from One Hundred and Ninth to One Hundred and Thirteenth street.

Avenue A, from Sixtieth to Sixty-seventh street.

Emerson street, from Broadway to Tenth avenue.

Amsterdam avenue, from One Hundred and Twelfth to One Hundred and Nineteenth street.

Delancey street, from Cannon street to East River.

Delancey street, from Bowery to Essex street.

Pine street, from Broadway to South street.

Gold street, from Liberty to Frankfort street.

Ann street, from Park row to Gold street.

Spruce street, from Nassau to Gold street.

Ferry street, from Gold street to East River.

Cliff street, from John to Frankfort street.

Broome street, from Bowery to East River.

Eldridge street, from Division to Houston street.

Allen street, from Division to Houston street.

Ludlow street, from Division to Houston street.

Liberty street, from Broadway to Gold street.

Cedar street, from Broadway to Pearl street.

Ninety-third street, from Second to Third avenue.

Ninety-fourth street, from First to Second avenue.

Bridge street, from Broad to State street.

John street, from Broadway to East River.

William street, from Beekman to Frankfort street.

Sheriff street, from Grand to East Second street.

Pitt street, from Division to Houston street.

Beekman street, from Park row to South street.

Suffolk street, from Division to Houston street.

Norfolk street, from Division to Houston street.

Pike street, from Division to Cherry street.

Pike slip, from Cherry to South street.

Park street, from Centre to Mott street.

Bayard street, from Bowery to Division street.

Hester street, Bowery to Division street.

Frankfort street, from Park row to Gold street.

Forsyth street, from Grand to Division street.

Fourteenth street, from Third avenue to Avenue D.

Stone street, from Whitehall street to Hanover square.

Edgecombe avenue, from One Hundred and Fiftieth street to St. Nicholas place.

Front street, from Whitehall to Dover street.

Water street, from Whitehall to Dover street.

Morris street, from Broadway to West street.

Six-inch Pipe.

One Hundred and Forty-third street, from Lenox avenue to Harlem River.

One Hundred and Fiftieth street, from Seventh avenue to Harlem River.

One Hundred and Fifty-third street, across Seventh avenue.

One Hundred and Fifty-sixth street, from Broadway to Riverside drive.

One Hundred and Thirty-second street, from Eleventh to Twelfth avenue.

One Hundred and Forty-fourth street, from Lenox avenue to Harlem River.

One Hundred and Forty-fifth street, from Lenox to Eighth avenue.

One Hundred and Forty-eighth street, from Lenox to Seventh avenue.

One Hundred and Fiftieth street, from Seventh avenue to Macombs Dam road.

Morningside Avenue West, from One Hundred and Tenth to One Hundred and Thirteenth street.

One Hundred and Thirty-fifth street, from Amsterdam avenue to Riverside drive.

Two Hundred and Second street, from Tenth avenue to Harlem River.

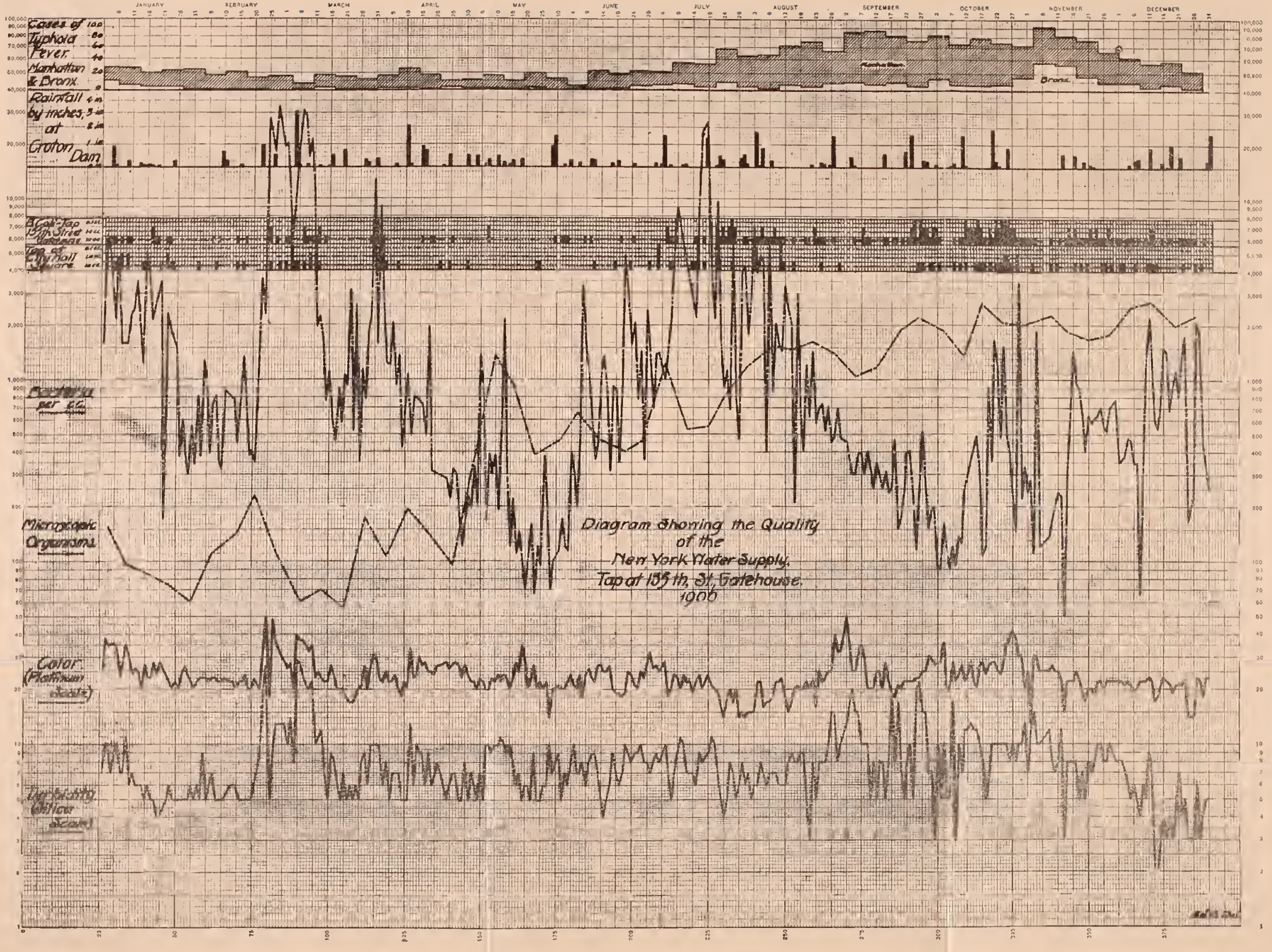


Diagram Showing the Quality of the New York Water Supply, Tap at 135th St. Gatehouse. 1906

BOROUGH OF THE BRONX.

Thirty-six-inch Pipe.

(R) Southern boulevard, from Crotona avenue to a point 500 feet north of same.

Twenty-inch Pipe.

(R) Cedar avenue, from Sedgwick avenue to One Hundred and Seventy-eighth street.

Twelve-inch Pipe.

Dongan street, from Westchester to Intervale avenue.

One Hundred and Sixty-fifth street, from Jerome to Gerard avenue.

Macombs Dam road, from Jerome to Inwood avenue.

One Hundred and Forty-ninth street, from Gerard avenue to Harlem River.

One Hundred and Seventy-third street, from Boston road to West Farms road.

Simpson street, from Westchester avenue to Dongan street.

Grand avenue, from Burnside to Tremont avenue.

One Hundred and Forty-ninth street, from Brook to Trinity avenue.

St. Anns avenue, from One Hundred and Forty-eighth to Rae street.

One Hundred and Thirty-second street, from Lincoln to Alexander avenue.

One Hundred and Eighty-first street, from Daly avenue to Boston road.

One Hundred and Eighty-first street, from Third avenue to Lafontaine avenue.

Perry avenue, from Woodlawn road to Two Hundred and Seventh street.

Westchester avenue, from Brook to Eagle avenue.

College avenue, from One Hundred and Sixty-fifth to One Hundred and Sixty-seventh street.

One Hundred and Sixty-fifth street, from Sherman to Morris avenue.

Longfellow avenue, from West Farms road to One Hundred and Seventy-second street.

Fordham road, across Old Aqueduct.

Tiffany street, from Lafayette to Viele avenue.

Whitlock avenue, from Hunt's Point road to Tiffany street.

Barretto street, from Southern boulevard to Whitlock avenue.

Westchester avenue, from Southern boulevard to Bronx river.

Jennings street, from West Farms road to Southern boulevard.

Kelly street, from Westchester to Intervale avenue.

One Hundred and Sixty-seventh street, from Prospect to Union avenue.

Edgewater road, from Westchester avenue to West Farms road.

One Hundred and Eightieth street, from Webster to Tiebout avenue.

Tiebout avenue, from One Hundred and Eightieth to One Hundred and Eighty-first street.

Grand avenue, from Fordham road to One Hundred and Ninetieth street.

One Hundred and Sixty-sixth street, from Clay to Morris avenue.

From Barretto Point across East River to Rikers Island, across Rikers Island; across East River, from Rikers Island to North Brother Island and across North Brother Island.

One Hundred and Fifty-first street, from Mott to River avenue.

Six-inch Pipe.

One Hundred and Sixty-second street, from Westchester to Prospect avenue.

Walnut avenue, from One Hundred and Thirty-second to One Hundred and Thirty-seventh street.

Fox street, from Longwood avenue to One Hundred and Fifty-sixth street.

St. Marys street, from St. Anns to Robbins avenue.

Beekman avenue, from St. Marys street to Beech terrace.

Crimmins avenue, from St. Marys street to One Hundred and Forty-first street.

Willow avenue, from One Hundred and Thirty-seventh to One Hundred and Thirty-eighth street.

Vyse avenue, from One Hundred and Eightieth to One Hundred and Eighty-first street.

Tiebout avenue, from Fordham road to One Hundred and Eighty-ninth street.

One Hundred and Seventy-third street, from Southern boulevard to Crotona Park East

Boone street, from Freeman street to One Hundred and Seventy-sixth street.

Crotona Park East, from One Hundred and Seventy-third street to Crotona Park East.

Fox street, from Tiffany street to Intervale avenue.

Beck street, from Tiffany street to Intervale avenue.

Avenue St. John, from Prospect avenue to Southern boulevard.

One Hundred and Thirty-second street, from Locust to Willow avenue.

Willow avenue, from One Hundred and Thirty-second to One Hundred and Thirty-fourth street.

One Hundred and Thirty-sixth street, from Locust avenue to New Haven Railroad.

Vyse avenue, from One Hundred and Seventy-second to One Hundred and Seventy-third street.

One Hundred and Seventy-second street, from Boston road to Southern boulevard.

Vyse avenue, from One Hundred and Sixty-seventh to Home street.

(R) Topping avenue, from One Hundred and Seventy-fifth to One Hundred and Seventy-sixth street.

Morris avenue, from Tremont avenue to One Hundred and Seventy-ninth street.

Boscobel avenue, from Jerome avenue to One Hundred and Sixty-ninth street.

Tiebout avenue, from One Hundred and Eighty-fourth to One Hundred and Eighty-ninth street.

(R) Prospect avenue, from One Hundred and Eighty-second to Grote street.

Grote street, from Southern boulevard to Crotona avenue.

Prospect avenue, from One Hundred and Eighty-seventh to One Hundred and Eighty-ninth street.

Bryant street, from Aldus street to Westchester avenue.

Bancroft street, from Westchester to Longfellow avenue.

Faile street, from Aldus street to Westchester avenue.

Aldus street, from Hoe to Longfellow avenue.

Freeman street, from Westchester avenue to West Farms road.

Fox street, from Prospect avenue to Avenue St. John.

Sherman avenue, from One Hundred and Sixty-third to One Hundred and Sixty-fourth street.

One Hundred and Eighty-ninth street, from Washington to Beaumont avenue.

William street, from Arthur to Belmont avenue.

Cambreling avenue, from Pelham avenue to St. Johns College.

German place, from Westchester avenue to Rae street.

Welch street, from Webster to Park avenue.

(R) Morris avenue, from One Hundred and Ninety-sixth street to Jerome avenue.

Carter avenue, from One Hundred and Seventy-third to One Hundred and Seventy-seventh street.

One Hundred and Seventy-fourth street, from Morris to Topping avenue.

Vyse avenue, from Tremont avenue to One Hundred and Eightieth street.

One Hundred and Ninetieth street, from Aqueduct avenue to Park View terrace.

Park View terrace, from One Hundred and Ninetieth street to Tee Taw avenue.

Morris avenue, from One Hundred and Seventy-fourth street to Teller avenue.

Walton avenue, from Tremont avenue to One Hundred and Seventy-ninth street.

One Hundred and Seventy-ninth street, from Jerome to Creston avenue.

One Hundred and Eighty-fifth street, from Third to Washington avenue.

Creston avenue, from Burnside avenue to One Hundred and Eighty-first street.

Two Hundred and Thirty-seventh street, from Keppler to Napier avenue.

Station place, from Gun Hill road to Two Hundred and Tenth street.

Lowmede street, from Gun Hill road to Two Hundred and Tenth street.

Mosholu Parkway South, from Jerome avenue to Two Hundred and Fifth street.

Kelly street, from Westchester to Longwood avenue.

Teller avenue, from One Hundred and Sixty-fifth to One Hundred and Sixty-seventh street.

Anna place, from Webster to Brook avenue.

Creston avenue, from Jerome avenue to Kingsbridge road.

Creston avenue, from Kingsbridge road to One Hundred and Ninety-first street.

One Hundred and Seventy-first street, from Webster to Park avenue.

St. Pauls place, from Webster to Park avenue.

Findlay avenue, from One Hundred and Sixty-fifth to One Hundred and Sixty-seventh street.

Briggs avenue, from Kingsbridge road to One Hundred and Ninety-fourth street.

(R) One Hundred and Eightieth street, from Anthony to Ryer avenue.

(R) Ryer avenue, from One Hundred and Eightieth to One Hundred and Eighty-third street.

Cheever place, from Mott to Gerard avenue.

Bryant street, from One Hundred and Seventy-seventh to One Hundred and Seventy-ninth street.

Macombs Dam road, from Jerome avenue to Macombs road.

One Hundred and Eighty-first street, from Jerome to Aqueduct avenue.

Anderson avenue, from Jerome avenue to One Hundred and Sixty-fourth street.

One Hundred and Fiftieth street, from River avenue to Harlem River.

One Hundred and Fifty-eighth street, from Third to Brook avenue.

One Hundred and Fifty-ninth street, from Brook to St. Anns avenue.

Tiffany street, from Southern boulevard to Westchester avenue.

Crotona Park East, from Southern boulevard to Crotona Park.

Bryant street, from One Hundred and Seventy-second street to a point 300 feet north.

Garden street, from Southern boulevard to Crotona avenue.

Wendover avenue, from Crotona Park East to Boston road.

Tiffany street, from Southern boulevard to New Haven Railroad.

One Hundred and Eighty-ninth street, from Beaumont avenue to Southern boulevard.

Decatur avenue, from Fordham road to One Hundred and Ninety-third street.

One Hundred and Seventy-second street, from Jerome avenue to Grand Concourse.

Kelly street, from Prospect avenue to One Hundred and Fifty-sixth street.

Fox street, from Westchester avenue to Dongan street.

One Hundred and Sixtieth street, from end of old 6-inch main to Cauldwell avenue.

Prospect avenue, from Crotona Park North to One Hundred and Seventy-fifth street.

Quarry road, from One Hundred and Eighty-first to One Hundred and Eighty-second street.

Charlotte street, from Boston road to Jennings street.

Seabury place, from Boston road to Wilkins place.

(R) Montgomery avenue, from One Hundred and Seventy-sixth to One Hundred and Seventy-seventh street.

Beck street, from Prospect to Leggett avenue.

Depot place, from Sedgwick avenue to Hudson River Railroad.

(R) One Hundred and Seventy-seventh street, from Cedar avenue to a point 570 feet west.

One Hundred and Ninety-sixth street, from Bainbridge to Marion avenue.

East of the Bronx River.

Twenty-Inch Pipe.

Westchester avenue, from Bronx river to Main street.

Two Hundred and Thirty-third street, from White Plains road to Bronx boulevard.

Twelve-Inch Pipe.

Eastchester road, from end of old 12-inch pipe to Bronx and Pelham parkway.

Two Hundred and Thirty-third street, from White Plains road to Barnes avenue.

Six-Inch Pipe.

Fillmore street, from Columbus to Morris Park avenue.

Taylor street, from Morris Park avenue to New Haven Railroad.

Hancock street, from Morris Park avenue to New Haven Railroad.

Van Buren street, from Morris Park avenue to New Haven Railroad.

Lincoln street, from Morris Park avenue to a point 400 feet west.

Louise street, from a point 300 feet west of Morris Park avenue to a point 300 feet east of Columbus avenue.

Unionport road, from Columbus to Morris Park avenue.

Jefferson street, from a point 400 feet west of Morris Park avenue to a point 200 feet east of Columbus avenue.

Saxe avenue, from Cornell to Westchester avenue.

Jefferson street, from Bronxdale avenue to a point 150 feet east of Barnett place.

Lincoln street, from a point 130 feet east of Barnett place to a point 700 feet west of same.

Madison street, from Bronxdale avenue to a point 150 feet east of Barnett place.

Louise street, from a point 230 feet east of Barnett place to a point 200 feet west of same.

St. Raymonds avenue, from Castle Hill avenue to Green lane.

Eleventh street, from Avenue D to Avenue E.

Green avenue, from Mapes avenue to a point 500 feet east.

Newell avenue, from Elizabeth to Morris street.

Second avenue, from Sixth to Eighth street.

Two Hundred and Twenty-eighth street, from White Plains road to Fourth avenue.

Two Hundred and Thirty-fourth street, from Catherine street to White Plains road.

Two Hundred and Thirty-third street, from White Plains road to Bronx boulevard.

Two Hundred and Thirty-third street, from Kingsbridge road to Jefferson avenue.

Repairing and Renewal of Pipes, Stopcocks, etc.

In addition to the regular district repair companies three gangs of men have been employed during the year making the necessary repairs and additions to mains, stopcocks and hydrants.

The amount of work done is as follows:

1 triple nozzle Standard New York hydrant reset.

38 additional double-nozzle Standard New York hydrants set.

9 additional double-nozzle New York case hydrants set.

25 double-nozzle Standard New York hydrants set in place of defective ones.

4 double-nozzle New York case hydrants removed.

19 Nos. 1 and 2 hydrants set in place of defective hydrants.

14 Nos. 1 and 2 hydrants repaired.
18 Nos. 1 and 2 hydrants reset.
12 No. 3 hydrants reset.
2 "B" hydrants set in place of defective hydrants.
1 "B" hydrant repaired.
4 double-nozzle "A" hydrants set in place of defective hydrants.
4 double-nozzle "A" hydrants repaired.
2 single-nozzle "A" hydrants set in place of defective hydrants.
3 single-nozzle "A" hydrants repaired.
1 No. 1 hydrant removed.
7 single-nozzle "A" hydrants removed.
1 new 4-inch stopcock and box set.
38 new 6-inch stopcocks and boxes set.
3 new 12-inch stopcocks and boxes set.
3 new 20-inch stopcocks and boxes set.
136 6-inch stopcocks repaired.
90 12-inch stopcocks repaired.
6 20-inch stopcocks repaired.
2 36-inch stopcocks repaired.
1 4-inch stopcock and box replaced.
39 6-inch stopcocks and boxes replaced.
1 10-inch stopcock and box replaced.
20 12-inch stopcocks and boxes replaced.
1 2-inch stopcock and box replaced.
22 6-inch mains repaired.
12 12-inch mains repaired.
8 20-inch mains repaired.
1 24-inch main repaired.
1 30-inch main repaired.
6 36-inch mains repaired.
11 48-inch mains repaired.
15 linear feet new 4-inch pipe laid.
1,852 linear feet new 6-inch pipe laid.
120 linear feet new 12-inch pipe laid.
47 linear feet new 20-inch pipe laid.
18 linear feet new 36-inch pipe laid.

12 linear feet new 48-inch pipe laid.
3 6-inch mains abandoned.
3 dead taps shut off.
96 taps changed from old to new mains.
13 connections made without shutting off water.
22 new stopcock boxes set.
49 4-inch stopcocks inspected and used.
432 6-inch stopcocks inspected and used.
9 8-inch gates inspected and used.
2 10-inch gates inspected and used.
191 12-inch gates inspected and used.
2 14-inch gates inspected and used.
11 16-inch gates inspected and used.
30 20-inch gates inspected and used.
27 36-inch gates inspected and used.
22 48-inch gates inspected and used.

SUMMARY.

Pipe.

Diameter.	Linear Feet Laid to December 31, 1905.	Linear Feet Laid from December 31, 1905, to December 31, 1906.	New York and Westchester Water Company.	Total Linear Feet Laid to December 31, 1906.
48-inch	176,225	8,517		184,742
36-inch	265,247	1,338		266,585
30-inch	44,819	...		44,819
24-inch	11,542			11,542
20-inch	350,716	*15,764	4,050	370,530
16-inch	21,282		7,500	28,782
14-inch			2,050	2,050
12-inch	1,340,985	167,039	22,900	1,520,924
10-inch	310		12,500	12,810
8-inch	4,496		37,000	41,496
6-inch	3,148,389	†130,582	65,000	3,343,971
4-inch	63,754		112,600	176,354
Total	5,427,765	313,240	263,600	6,004,695
Miles	1,027.99	59.32	49.92	1,137.23

*Less 1,300 linear feet of 20-inch pipe abandoned.
†Less 4,235 linear feet of 6-inch pipe abandoned.

Hydrants.

Pattern.	Placed to December 31, 1905.	Placed from December 31, 1905, to December 31, 1906.	New York and Westchester Water Company.	Total Placed to December 31, 1906.
Nos. 1, 2 and 3	3,391	4		3,383 *a*
Victor	131			130 *b*
A	4,418			4,377 *c*
B	1,787			1,786 *d*
Double nozzle A	512	3		513 *e*
Triple nozzle, New York Standard	206			206
Double nozzle New York Standard	446	1,462		1,908
Double nozzle, New York Case	2,734	37		2,756 *f*
Single nozzle, New York Case	833	67		899 *g*
Miscellaneous	308		438	746
Total	14,766	1,573	438	16,704

a Less 12 Nos. 1, 2 and 3 hydrants abandoned.
b Less one Victor hydrant abandoned.
c Less 41 A hydrants abandoned.
d Less one B hydrant abandoned.
e Less two double nozzle A hydrants abandoned.
f Less fifteen double nozzle New York Case hydrants abandoned.
g Less one single nozzle New York Case hydrant abandoned.

Stopcocks.

Diameter.	Set to December 31, 1905.	Set from December 31, 1905, to December 31, 1906.	New York and Westchester Water Company.	Total Set to December 31, 1906.
48-inch	44	2		46
36-inch	83	1		84
30-inch	33			33
24-inch	13	2		15
20-inch	327	16	2	345
16-inch	25		1	26
14-inch			1	1
12-inch	3,014	583	6	3,603
10-inch	6		6	12

Diameter.	Set to December 31, 1905.	Set from December 31, 1905, to December 31, 1906.	New York and Westchester Water Company.	Total Set to December 31, 1906.
8-inch	206		5	211
7-inch	1			1
6-inch	8,966	1,763	42	*10,762
4-inch	265		49	314
Total	12,983	2,167	112	15,453

* Less 9 6-inch stopcocks abandoned.

Work Done By Repair Companies.

New hydrants set in place of those defective	804
Old hydrants repaired	12,100
New stopcocks set in place of those defective	55
Leaky mains repaired	2,274
Taps shut off at main (service pipe defective)	1,443
Hydrants found improperly closed after use	2,619
Linear feet of pipe used in repairs to Croton mains	2,248¾

Permits to Tap on City Mains.

Manhattan	1,356
The Bronx	2,207
	3,563

Connections on Mains over One Inch Granted.

2 inch to be metered	153
3 inch to be metered	11
4 inch to be metered	11
6 inch to be metered	1
10 inch to be metered	1
Total	177

City Plumber.

New horse troughs set by resolution of Board of Aldermen	11
Old horse troughs repaired	231
Horse troughs removed permanently	1
Horse troughs changed to new locations	4

Horse troughs to be set by the Society for the Prevention of Cruelty to Animals—resolution of the Board of Aldermen.

The Board of Aldermen have passed fifty-seven resolutions allowing the Society for the Prevention of Cruelty to Animals to set at different localities in the Boroughs of Manhattan and The Bronx, what are known as "Man and Beast" fountains, these fountains to be furnished and kept in proper repair at the expense of this society, but water to be furnished to them free by the City.

On account of the limited fund set aside for repairs to old horse troughs and setting of new ones owned by the City and entirely under the care of this Department, there are forty-two resolutions to set new horse troughs at different localities in the Boroughs of Manhattan and The Bronx, upon which work had to be suspended.

On August 1, 1906, one new company, known as Company No. 3 was added to the repair companies (which now number eight) in the Bureau of the Chief Engineer, outside of what are known as the floating gangs.

DISTRIBUTION SYSTEM.

BOROUGH OF MANHATTAN.

Maps and Records.

The utter lack of accurate records and plans of the distribution system in such form as to make them available, was referred to in previous reports and work started to prepare such maps.

Owing to the lack of sufficient force, the work has not progressed as rapidly as would be desirable, but the maps for the First District, extending from the Battery to Houston street and from the North River to the East River, have been completed on a proper scale and show the location of mains, gates, hydrants, types of the latter, and as far as possible, the date of installation of the mains. The surveys have extended beyond the First District and well into the Second, but the mapping of that work has not yet been completed.

The records of the gates and their locations, with the location of the valves for shutting down the large water mains, has progressed further. The surveys have been completed and mapped and the sheets have been bound in book form of portable size and copies of these books have been furnished to the various pipe yards. The districts completed are as follows:

District No. 1—From the Battery to Houston street and from the East River to the Hudson River;

Districts No. 2 and No. 3—From Houston street to Forty-second street and from the East River to the Hudson River;

District No. 4—From Forty-second street to Ninety-sixth street and from the East River to the Hudson River;

Districts No. 5 and part of No. 7—From Ninety-sixth street to Harlem River Ship Canal and from the Harlem River to the Hudson River.

Mains.

In all new work, both in Manhattan and in The Bronx, we have excluded 6-inch mains and the specifications for pipes, methods of laying, etc., are in accordance with the plans discussed in the last annual report. The failure to take action on the recommendation for an appropriation to carry out the provisions of the act "to provide for obtaining information as to the consumption and waste of water in The City of New York," which would have enabled us to increase the force and obtain the necessary instruments for the measurement and flow, etc., has prevented us from making the investigations outlined in the last annual report to determine the flow of the large mains so as to avoid undue losses by friction or resistance and properly locate the trunk mains.

We expect next year to be able to begin work on the trunk main on the East Side to which reference was made in the last annual report.

The smaller 12-inch mains to reinforce the distribution system and increase the pressure on the East Side have, however, been laid between Houston and Division streets and between Third avenue and the East River, and about 360 additional fire hydrants have also been installed in that district. Furthermore, in the district east of Broadway from Frankfort street to the Battery, 12-inch mains have been laid in those streets hitherto supplied only by old 6-inch mains and about 260 new hydrants have been installed.

In The Bronx, about twenty-eight miles have been added to the distribution system and about 570 additional hydrants installed.

Work on the two 48-inch mains from Jerome Park has been completed on the Seventh avenue section, between One Hundred and Fifteenth street and One Hundred and Thirtieth street and on the Jerome avenue section pipes and castings have been made and delivered on the work in preparation for laying as soon as the season opens.

The 48-inch main from Central Park to run down Eighth and Ninth avenues, has been laid down to Sixty-second street and Broadway.

Cover Over Rapid Transit Tunnels.

In designing and laying the High Pressure Fire System mains, in locating the 48-inch mains down Eighth and Ninth avenues, and in endeavoring to provide connection from Fifth avenue eastward with the proposed East Side main, say from Chambers to Twentieth and Twenty-first streets, referred to in the last Annual Report,

the main difficulty encountered has been the method of crossing the Rapid Transit tunnels owing to insufficient covering.

In the laying of the high pressure mains, this has led, among other unfavorable results, to a succession of dead ends in Broadway and in the mains from Central Park to a more complicated alignment and the manifolding of the mains; while as regards the new main on the East Side, we have yet been unable to determine upon a satisfactory method of crossing and will certainly be compelled to go much higher north than would otherwise be necessary with a corresponding increase in the length and cost of the proposed main.

The necessity of so designing and constructing the Rapid Transit tunnels as to leave sufficient covering over them for our pipes is evident and I would strongly recommend that this matter be brought to the attention of the Rapid Transit Commissioners, so that this difficulty may be avoided in the future.

In this connection it is well to add that the work of laying our pipes is also unnecessarily increased by the numerous gas mains on our streets. There seems to be no reason why these various mains should not be consolidated into a single one and I also recommend that such measures as may be deemed advisable be taken to secure this result. The matter should be taken up with the gas companies as speedily as practicable.

Recording Gauges.

Owing to the lack of appropriation, we have been yet unable to have recording gauges installed at the engine houses as recommended in my last Annual Report as well as continuous recording gauges at the various pipe yards.

Notice from Fire Department.

In order to co-operate with the Fire Department in the shutting down of gates, an arrangement has been made under which the Fire Department will send a notice of second alarm fires to our yards so that men can be detailed therefrom to operate the gates where necessary.

Gates.

Additional gates have been installed, as far as the appropriations granted have allowed, and they are regularly inspected so as to secure their being in good working order.

Repair Gangs.

It has not been possible, owing to lack of appropriations, to make the subdivision of districts recommended in my last Annual Report and still less to purchase the necessary buildings for repair yards and headquarters of these repair gangs. The Second District, formerly extending from Houston to Forty-second street, has, however, been divided into two districts, with Fifth avenue as the dividing line; the

eastern portion has its headquarters at the Twenty-fourth street pipe yard and the repair yard of the western portion remains as before at West Thirty-seventh street.

On the evening of January 5, 1906, James Pilkington, a contractor (who was tunneling through Fifth avenue, between Thirty-third and Thirty-fifth streets, under permit issued to Marc Eidlitz for the purpose of constructing a sewer to drain the new Altman Building in Fifth avenue, between Thirty-fourth and Thirty-fifth streets), set off a blast which seriously injured one of our large water mains in Fifth avenue at that point. This injury, which seemed at first to be a slight one, developed into a very serious leak, and gangs of men from this Department, being hastily called to the scene, found it necessary to shut off a large main which was fractured.

As we have two 48-inch, two 36-inch, one 20-inch and one 12-inch main in Fifth avenue, there was serious difficulty encountered in determining which one of the mains was broken, and the only way to do this was to shut off each line in succession. When this was done, it was found that the easterly 36-inch main had been broken. Immediate steps were then taken for the purpose of repairing this main, and when it was uncovered, we discovered that the length of pipe just south of the south crosswalk of Thirty-fourth street had been split nearly the entire length. Further investigation showed that the tunnel excavated by Mr. Pilkington, instead of having been constructed upon the lines called for by his permit, had been allowed to swing over to the west, nearly to the centre of Fifth avenue, so that the blast which was set off that afternoon occurred directly under the 36-inch pipe which was broken. A gang of men was placed on the work of repairing this 36-inch main, and the work was continued without ceasing night and day until the main was repaired and the water turned on.

On the afternoon of February 17, 1906, an extraordinary blast was set off by a cellar excavator named Antonio Pucci, in Convent avenue, East Side, in the vicinity of One Hundred and Twenty-eighth street. The blast was so heavy that it threw into Convent avenue large quantities of rock and stone, which broke through the paving and fractured two of our 48-inch water mains at that point. This was particularly unjustifiable inasmuch as letters had been sent to Pucci and to others blasting in the vicinity, warning them of the close proximity of our water mains and of the danger thereto incident to their blasting.

Water was promptly shut down at the One Hundred and Thirty-fifth street gate house by our men stationed in that location for such an emergency, but notwithstanding our promptness a great deal of property in the vicinity was flooded and damaged. Careful investigations were made to find out which of the eight lines had been damaged by the blasts, and those which were found to be unhurt were immediately again put into service.

Measures were taken at once to repair the damage done, and the employees of the Department and contractors worked day and night to hasten its completion, which was soon effected and the water turned on again in the main.

On the morning of October 31, 1906, at 4.20 a. m., a telephone message was received at the headquarters of Repair Company No. 4, at Sylvan place and One Hundred and Twenty-first street that a serious leak had developed in the water main on Ninety-eighth street, between Amsterdam avenue and Broadway.

The night gang proceeded to this point and promptly started to shut off the valves.

No difficulty was experienced in locating the valves, which were closed down as rapidly as their large size would permit.

Owing to the fact that the 36-inch main on Ninety-eighth street did not have a valve on each side of the single connection to Ninety-eighth street pumping station, it was found necessary to close down the pumps at this station for several days.

The loss of pressure due to the closing down was partially relieved by increasing the amount pumped at One Hundred and Seventy-ninth street and High Bridge pumping stations.

Four repair gangs were at once put on this work, which was prosecuted day and night, until the broken pipe was removed and a new section put in.

Over the broken pipe the fill was about 12 feet deep owing to a regrading of the street some time after the pipe had been laid in the ground. This extra weight may have been the cause of the break, as after the pipe was uncovered a very large stone was found to be resting on the main and it appeared as if the rock had been dumped there in the regrading of the street.

BOROUGH OF QUEENS.

Supply.

The pumping and boiler plants at station No. 1 are in first-class shape and at this time it is impossible to further develop the water yield, except such as may be gained by the cleaning out of the present well system.

Plans and specifications have been prepared for a fence to properly enclose and protect the pumping station and grounds adjacent thereto.

It is difficult to determine the yield of pumping station No. 2, particularly in view of the imminent danger of an increase of chlorine through the infiltration of salt water. The daily yield may probably be estimated at, say, 400,000 gallons or 500,000 gallons, which hardly pays for running this station, so that it would be abandoned permanently now were it not for the extreme scarcity of water in the First Ward. We will, however, put it in commission after doing no more than absolutely necessary to run the station with safety.

In order to prevent possible accidents and resulting damages, it would be well, and we propose, to fence the large 16-foot open well. Later on it would be advisable to secure an appropriation sufficient to drive test wells to ascertain the possibility of additional supply in the First, Second and Third Wards, and if such an appropria-

tion is granted some of these wells may possibly be driven in the vicinity of station No. 2.

Pumping station No. 3 is in fairly good state of repair and is yielding about the maximum amount of water which is possible to be developed at this location.

The need of a reserve storage for supply in case of shutting down of the pumps in the First Ward and also to secure steadier and better fire protection is severely felt. In order to supply this deficiency I propose therefor the erection of a suitable standpipe of a capacity of, say, about 1,000,000 gallons, and will make the necessary surveys to locate it as soon as practicable.

The average daily yield of the Flushing pumping station, Third Ward, during the past year has been slightly in excess of 1,500,000 gallons. This might have been increased by forcing the pumping, but it has not been found advisable to resort to this extreme measure. The present plant consists of one 3,000,000-gallon engine, which on the test duty trial showed a duty in excess of 110,000,000 foot pounds of work per million British thermal units furnished to the engine, and another of half this capacity, which is held in reserve and which is very seldom called into service.

The water is supplied to the engine from the present pond and from the deep wells by means of air-lift system, the air for which is furnished by a duplex compound air compressor. This method of pumping at this station has proved to be a very uneconomical one. As noted in this report, the station duty for an average pumping of over 1,580,000 gallons per day shows the duty based on the total net head on the pump to be but slightly in excess of 22,000,000 foot pounds of work per 100 pounds of coal used. This shows a falling off in duty of slightly over 9,000,000 foot pounds of work during 1905, when the average yearly duty was slightly in excess of 31,680,000 foot pounds of work per 100 pounds of coal used.

It is evident from this that a plant of this kind, involving the use of air, shows a very early falling off in efficiency and becomes very expensive to operate, and I therefore recommend that provisions be made to pump the present supply in a more economical manner, and that means be provided to determine the amount to which the average daily yield at this station may be increased.

In order to reach the water by direct suction of the pumps at the level at which it is now probably located in the ground, it would be necessary to considerably remodel the plant by lowering the present 3,000,000-gallon pump sufficiently to enable it to get all this water by direct suction and all of the present air-lift wells should then be connected up as ordinary suction wells. The delivery from this station should then be increased by whatever amount it may be shown from test wells that the present yield may be developed. To carry this scheme into effect and to secure better economy, the present No. 1 Snow pump of 1,500,000 gallons capacity should be replaced by a new high duty vertical crank and flywheel engine, with a capacity dependent on the ultimate development at this station. The water ends would be set sufficiently low to maintain the level of the underground water as at present.

The present boiler capacity will probably be sufficient to run the new engine. The rearranging of the pumping plant at this station will necessitate the reconstruction or rebuilding of the engine house, and provision will also have to be made for an increased coal storage capacity. The latter is very vital, as, in order to get economical prices for coal, the Department must be able to provide storage for an amount equal to that which will be consumed during the four months constituting the winter period.

The earliest and cheapest addition to the water supply in the Borough of Queens to be obtained is by filtering the waters from Oakland Lake, which in its present condition is objectionable. Probably an additional daily supply of 1,000,000 gallons could thus be secured. Some time ago I made this recommendation, but no action was then taken. Under present conditions I believe it should be no longer delayed.

Several methods of purification of this water are now under consideration, and I will report more fully upon these later.

In addition to using the waters from Oakland Lake, I recommend that the present well system be thoroughly overhauled and the yield from these shallow wells brought up to a maximum; also that sufficient land be procured to the north of Broadway to permit of the driving of additional shallow and deep wells and thereby availing the Department of the water from these other strata.

The present pumping plant is sufficiently equipped with boiler capacity to probably supply all the steam necessary to pump this anticipated ultimate supply, but the present pumping units will be entirely inadequate to do the work, and new pumping engines of the modern high duty type, with water ends arranged to reduce the suction lift to a minimum, will necessarily have to be installed to efficiently and economically pump this water. The installation of these new units will probably necessitate the remodeling of the present engine house and coal bunker.

The above extensions in this Borough may suffice for a few years. Further additions can always be obtained from entirely new sites, condemnation or absorption of private pumping stations or a supply from the Borough of Manhattan.

The Whitestone pumping station has hitherto been used entirely as a reserve station, to be drawn upon only in times of shortage or a breakdown at the other stations, and its average yield last year was less than 200,000 gallons per day. This year we have been compelled to run it regularly, and its average yield has been about 364,000 gallons. It is reported that the original daily yield from this station was about 600,000 gallons, but no authentic records are available to verify these figures. This station, like station No. 2, is a very expensive one to run, owing to its limited yield, and its operation can only be warranted by the extreme scarcity of the water supply in this Borough. If the appropriation for test wells, referred to when discussing station No. 2, is granted some experimental tests may also be made in the vicinity of the station.

At each of the pumping stations in the Borough of Queens, in order to properly check up the amount of coal burned and see that same corresponds with the weight

of coal delivered at the station, I recommend that the bunkers be divided into two or more pockets, so as to facilitate the checking and proper handling of the coal.

Distribution System.

The general condition of the distribution in this Borough is good, owing to many new lines of large size which have been laid during the year.

The contract of D'Ambra & Tuccillo is practically complete and water is now being received through the mains; the final estimate of the contract with Norton & Dalton has been completed, and the contract with James P. Graham has been commenced on Lawrence street, Third Ward.

During the year the Citizens' Water Company started the operation of their new station at Alley Pond, which has improved the supply in the Town of Newtown, as well as in Long Island City.

Statement of Fire Hydrants for Which the City Pays Rental to Water Companies.

Name of Company.	Rate.	Number in Use January 1, 1906.	Number Set in 1906.	Total.	Annual Cost.
Citizens' Water Supply Company.....	$25 00	100	..	100	$2,500 00
Citizens' Water Supply Company.....	20 00	480	42	522	10,440 00
Citizens' Water Supply Company.....	18 00	140	..	140	2,520 00
Citizens' Water Supply Company.....	15 00	12	..	12	180 00
Jamaica Water Supply Company.....	18 00	977	12	989	17,802 00
Queens County Water Company.....	20 00	307	38	345	6,900 00
Woodhaven Water Supply Company.....	18 00	712	21	733	13,194 00
Total.....		2,728	113	2,841	$53,536 00

Note—In addition to the above a number of hydrants have been ordered but not yet set.

Work Done by the Repair Gangs.

Kind of Work Done.	First Ward.	Third Ward.
Taps made	546	289
Taps repaired		8
Leaks repaired	54	117
Stop cocks repaired	64	56

Kind of Work Done.	First Ward.	Third Ward.
Hydrants repaired	816	141
Gate boxes repaired	5	77
Stop cocks reset	20	11
Hydrants reset	51	61
Gate boxes reset	141	81
Hydrants removed	14	4
Water pressures taken	682	58
Linear feet of water main laid		60
Linear feet of water main lowered	600	126
Private connections made	2	1
Meters set	2	
Meters repaired	6	
Meter boxes built	10	4
Check valves set	1	
Taps closed	7	
New stop cock boxes set	36	11
New hydrants set	2	
Connections made	3	
Notifications of leaks served	37	
Times water shut-offs were served	33	
Times water was shut off and turned on	33	3
Times samples of water were taken	134	
Blow-offs set	1	
Times dead ends were blown out	28	
Times feeding lines were examined	4	
Times water was turned on new meters and pipe lines	16	
Stop cocks examined	130	
Hydrants examined		600
Drinking fountains repaired		6
Linear feet of water main removed		60
Times leaks were investigated	18	
Times water was shut off	25	

Miscellaneous—Men at work at the corporation yard at the different pumping stations, regulating water pressures and valves, notifying water takers, locating and operating valves, inspecting and pumping out hydrants, etc., during the year.

Statement of Lengths of Water Mains in Use December 31, 1905, Lengths Added, to December 31, 1906, and Total Lengths in Use December 31, 1906, With Number of Stop-Cocks and Hydrants.

Size of Main and Stop-Cocks.	Mains in Use, December 31, 1905. Linear Feet.	Additions to December 31, 1906. Linear Feet.	Total Mains in Use, December 31, 1906. Linear Feet.	Stop-Cocks in Use, December 31, 1905.	Additions to December 31, 1906.	Total in Use, December 31, 1906.
24-inch	17,500		17,500	6	..	6
20-inch	28,847		28,847	18	..	18
16-inch	25,470		25,470	18	..	18
14-inch	7,002		7,002	5	..	5
12-inch	102,782	28,460	131,242	147	120	267
10-inch	31,789		31,789	42	..	42
8-inch	118,394		118,394	201	15	216
6-inch	272,982	16,922	289,904	595	182	777
4-inch	64,013		64,013	54	..	54
Total	668,779	45,382	714,161	1,086	317	1,403

Hydrants in use December 31, 1905	1,264
Additions, to December 31, 1906	138
Total in use December 31, 1906	1,402

Work Completed Under Public Award.

Contractor.	Ward.	Date of Contract.	Date of Completion of Work.	Cost of Work.	No. of Miles of Mains Laid.	No. of Hydrants Set.	No. of Gates Set.
D'Ambra & Tuccillo	Third	Jan. 15, 1906	Dec. 15, 1906	$9,238 00	1.5	38	37
D'Ambra & Tuccillo	First	Jan. 15, 1906	Dec. 15, 1906	91,245 00	5.4	100	145

BOROUGH OF RICHMOND.

All the necessary field work in connection with the proposed introduction of water from the State of New Jersey was done, and the notes plotted.

A large map covering the entire distribution system and including both those of the private companies as well as the mains belonging to The City of New York, was completed and copies of the same were given to the Fire Department.

Examinations and reports have been made on the various applications of the Fire Department for mains and hydrants, and examinations and reports have also been made on the applications by private companies for permission to make extensions to their systems.

Plans and specifications were prepared during the year for forty-nine thousand eight hundred and two (49,802) feet of water mains, ranging in size from eight to sixteen inches in diameter.

One hundred and seven (107) new hydrants and forty-one (41) gate valves have been provided for in connection with the distribution system.

This Department was advised that the Crystal Water Company would be transferred to the City as of July 1, 1906, and that possession would be given on October 1. On this assumption, and in order to be in a position to operate these plants during the remainder of the calendar year, a communication was addressed, on September 17, to you, submitting an estimate of the amounts required to operate and maintain the pumping stations of the Crystal Water Company, i. e., the Bulls Head, Clove road and Grant City stations, respectively. These stations are in such shape that immediate repairs should be made, and in some cases important renewals. Authorization to make these repairs, to the amount of $8,000, without the necessity of advertising, was also requested. No action has been taken on these recommendations, however, it having been ascertained that the transfer of the Crystal Water Company had been postponed until next year.

Contract with Hudson County Water Company.

Under this contract water was to be delivered by the company and the City was obliged to take it, in June of this year, and the contracts for the mains required to distribute this water were awarded early in the year, and time of completion fixed so that no delay would be experienced in securing the new supply, but after the award of this contract, in view of the injunction granted by the Vice-Chancellor of the State of New Jersey restraining the company from delivering water out of the State, it was deemed advisable not to proceed with the work of laying the mains, and the contractors were so notified.

The Vice-Chancellor's injunction was made permanent by decision of the Court of Errors and Appeals, rendered on November 19, 1906, from which an appeal has been taken by the company to the United States Supreme Court at Washington, where the matter now lies. I am informed that the decision of the Court of Errors and Appeals forbidding the company from taking out of the State the surface waters which they proposed to furnish under their contract, makes a statement to the effect that the company could not be restrained from carrying underground waters out of the State, and probably a modification of the contract would be proposed by the company in accordance with this decision.

Distribution System.

The information obtainable in connection with the distribution system, belonging to the various private water companies, as well as to the City, has been plotted on one map, which also shows all the gates and hydrants so far as their location is at present known. I have found in several instances, however, that the old maps furnished to us are unreliable, and I am arranging to make a sytematic examination of the conditions existing, in order to get an accurate map of the entire water supply system of the Borough.

In connection with the proposed supply of water from New Jersey, and the mains it was contemplated to lay for its distribution, surveys were made of all the principal thoroughfares, and will be ready for the various lines that are proposed for the ensuing year. One contract has been let for new mains in various streets and avenues, and the pipe is now being cast. The contractor is making all the necessary arrangements to begin laying as soon as the pipe arrives on the ground. Another contract for mains is in course of preparation, and should be ready in a very short time. This contract includes proposed mains on the distribution system of the Crystal Water Company, which it is contemplated will have been taken over by the City by the time the contract is ready for printing.

Studies have been made with a view to dividing the Borough into various zones of distribution, in order to avoid the excessive pressures it is now necessary to carry. The Crystal Water Company's stations are now pumping against a pressure of 150 pounds, and it is advisable to reduce this as much as possible. Tentative zones have been chosen, and the practical details are now being examined, so that all the work done from now on will be in accordance with a well defined system.

During the year a large number of reports have been made on complaints of various kinds, as well as special examinations of applications for mains, hydrants, etc., which cannot be tabulated. Since the passage of the budget for the year (1907), in which was allowed an addition to the maintenance force, arrangements have been made for a better organization and an increased efficiency on the lines which have been laid down.

MECHANICAL DIVISION.

BOROUGHS OF MANHATTAN AND THE BRONX.

Reports for Quarter Ending December 31, 1906.

Ninety-eighth Street Pumping Station.

Pumping Engine No. 1—Minor repairs and renewals were made to the priming, draining and other auxiliary piping on the steam and water ends of this pump; the check valve on the discharge main being thoroughly overhauled. On the water end of this pumping engine the studs in the cylinder head were renewed and a suspension bracket was put in place. The water chamber was drilled and a water column mounted thereon.

The line to the jacket condenser was renewed.

A new cut-off valve for the crank end of the high pressure cylinder of the left hand engine was made, fitted and placed.

Pumping Engine No. 2—Minor repairs were made to the jacket piping and auxiliary piping on this engine. On the water end the studs in the cylinder head were renewed and a suspension bracket was put in place. The water chamber was drilled and the water column mounted thereon.

The gate valves on the suction and discharge lines were overhauled. Repairs were also made to the air compressor.

Pumping Engine No. 3—The extensive repairs on this engine which were begun in January, 1905, were brought to a close early in the year when the engine was started up, the valves were adjusted, the engine balanced and all leaks in the piping and auxiliary connections were corrected. The crossheads were drilled and tapped for oil cups, and all auxiliary apparatus was thoroughly overhauled and put in first-class running order.

The metallic packing installed in this engine during the time of recent repairs leaked considerably after the engine was put under steam. The contractors were notified of this trouble and the packing was refitted and afterwards gave improved service.

Minor repairs were made to the drain from this pump.

An indicator reducing motion with indicating piping complete was put in place.

Discharge piping on pumping engines Nos. 1, 2 and 3 was scraped and painted and the lagging was oiled.

In the basement of the engine room several abandoned pipe lines were removed.

Boilers Nos. 1 and 2—Repairs and renewals were made in the feed connections, gauge glass connections and in the blow-off and other appurtenances. Repairs were also made to the boiler shells, damper regulators and main stop valves, and renewals were made of the boiler trimmings.

Boilers Nos. 5, 6, 7 and 8—Repairs were made to the shells, damper regulators, auxiliary piping and trimmings on these boilers.

The outer walls of the settings of the back connections were repaired and the brickwork in the furnaces was renewed. Repairs were also made to the grates and firing tools.

Part of the main steam piping in the boiler room was replaced and new hangers were installed to properly support this line. Repairs were also made upon the steam lines on the horizontal return tubular boilers.

In the coal house scales were repaired; a new bulkhead was built, and the coal house windows were boarded up to increase the storage capacity.

The buildings in general were cleaned up and whitewashed or painted.

One Hundred and Seventy-ninth Street Pumping Station.

Pumping Engines—Repairs and renewals were made to the jacket and drain piping, oil cups, air chambers, gauge glasses, etc. In many cases the auxiliary piping was simplified to a great extent, and in the future the amount of pipe and the number of valves and fittings required, for repairs and renewals, will be considerably less. There still remains considerable of this kind of work to be done.

On the No. 2 engine a broken cam of the admission valve of the low pressure steam cylinder was replaced and a new crank was fitted to the low pressure exhaust valve.

Engines Nos. 1, 3 and 4 were provided with new brackets and shafts for the valve gear of the high pressure side of each engine.

In engine No. 4 new studs, springs and valves were placed in the water end, where necessary.

The high pressure connecting rod on engine No. 4 was removed and brasses trued up and relined. New plug valves and springs were fitted in the dash pots.

Engine No. 2, which has undergone extensive repairs, after receiving the necessary adjustments and otherwise being eased up after its long period of idleness, was finally, on March 20, put into regular service, and after correcting one or two minor defects, the engine is now in first class condition and is giving the most reliable service of any engine in this station.

In addition to other small repairs on the steam lines in the engine room, repairs were made on the 4-inch steam line leading to engines Nos. 1 and 3, and two new lengths of 10-inch pipe were introduced to the main steam lines to engines Nos. 1, 2, 3 and 4. The major part of these repairs to the steam lines might have been avoided if the contract for the new steam lines, bids for which were opened on May 23, had been immediately executed and the contractor had expedited the work and completed same in the required time.

For the use of engines Nos. 5 and 6, two small independent air pumps were installed on a separate brick foundation in the basement, to be used for starting the engines and in case of emergency when the attached air pumps, with their driving mechanisms are in need of repair or otherwise giving unsatisfactory service. The ejectors formerly used for starting these engines have become unreliable and the installation of these two small pumps has proven very beneficial.

On engines Nos. 5 and 6, in addition to many minor repairs to auxiliary piping and making of steam joints, etc., it has been found necessary to renew many of the studs, springs and valves in the water ends.

Boilers—General repairs were made to the boiler furnaces, settings, grate bars and shells. In boilers Nos. 1 and 2, rivets in shell and dome were cut out and redriven and the furnace arch blocks and cheeks were rebuilt.

On boilers Nos. 3 and 4 defective tubes were cut out and new tubes were put in and expanded.

Back wall and bridge walls of No. 3 boiler were rebuilt; the bonnets of the blow-off valves, feed pipe, the water column nipples and the bolts in the boiler fronts were renewed.

On boilers Nos. 5, 6, 7 and 8 the bridge walls and back walls were rebuilt, repairs were made to grates and to the steam lines. Blow-off piping in valves were renewed.

In boilers Nos. 5 and 7 tubes were cut out and replaced.

On boilers Nos. 9, 10 and 11 the bridge walls and back connections were rebuilt and the injectors were connected up.

The automatic damper regulators were repaired and connected to the tower service. The separate return lines which were formerly used for the drains from engines Nos. 5 and 6 were connected to these boilers.

The main steam line leading from boilers Nos. 5, 6, 7 and 8 received considerable overhauling and connections between the steam lines from the various boilers were made more secure.

Considerable repairs were made on the coal conveyor. Many new wheels, buckets, brackets, etc., were put in place and renewals made upon the steam lines leading to the coal conveyor engines.

Early in the year, owing to the impending coal strike in the anthracite coal regions, it was found advisable to store some of the coal in the courts and to the north and to the west of the boiler house.

The work under the contract made on August 29, 1905, with the firm of Snare & Triest, of No. 143 Liberty street, New York, for furnishing materials and building monitors on the engine houses at One Hundred and Seventy-ninth street and at Jerome avenue Pumping Stations, and building grating platforms and stairways in the basement of engine house at One Hundred and Seventy-ninth street, was completed early in the year, final payment on same being made on May 7, last.

Plans have been prepared for and work is under construction for iron and glass office for the use of the engineman in charge of this station.

Bids were opened on May 23, 1906, for a complete high pressure steam line for the engine room in this station. A contract for the same was awarded to William R. Horne, and he was notified to begin work on September 12, 1906, The contractor has made very little progress on this work up to the present time, with the result as before stated, that the City has been obliged to make many costly and expensive emergency repairs to the present main steam lines.

High Bridge Pumping Station.

This station was held entirely in reserve until about the middle of the third quarter, when the station was started, running one eight-hour watch per day and then kept on emergency or reserve conditions during the other sixteen hours of the day.

The boilers at this station are in excellent state of repair; the pumping engine No. 1 (Delamater), 5,000,000 gallons daily capacity, which has been shut down for several years and was more or less damaged by frost, has been partially overhauled and preparations are being made to get it ready for regular service.

The Worthington engine No. 2 which was overhauled during the past year, is in pretty fair running order and is now being used in the actual service every day during the eight-hour run.

Extensive renewals and repairs are being made upon the steam heating and drain pipes from same in this station and when same are completed, this station will be habitable and adapted for regular service.

Jerome Park Pumping Station.

On pumping engine No. 2 repairs were made to the leak on the high pressure cylinder head and to the bearings of the air pump rocker shaft.

Repairs were also made to the jacket pumps, to the rocker shaft of pumping engine No. 3, and to a leak in the main steam line in the engine room.

Several serious leaks in the steam line in the boiler room have occurred, but they were temporarily repaired by means of clamps, hangers, straps, etc., but the condition of the steam lines becoming aggravated, it was found necessary to purchase new valves and fittings and have new lengths of pipe made in order to insert same in the steam line, and a shut down was made at 11.15 p. m., on November 21, and the requisite repairs were made. During this time the pressure fell from the normal seventy-one pounds to an average thirty pounds, which was due to the pressure from the Williamsbridge reservoir. The shut-down lasted until 1.15 a. m., when the engines were started up again and at 1.45 a. m. the pressure of seventy-one pounds on the distribution system was restored. The success of this shut-down may be appreciated when it is considered that the pressure in the entire Borough of The Bronx was reduced from its normal of seventy-one pounds per square inch to that of thirty pounds per square inch, due solely to the head received from the Williamsbridge reservoir, and which served to keep the major portion of the distribution system filled in case of fire and only a few scattering points in the high areas were probably without water. The Fire Department was duly notified and other public institutions were advised to make provision for a shut-down which would probably last two or three hours. It may be pertinent to add that the work was carried to a very successful conclusion in the time anticipated and that not a single complaint was received and doubtless no one except those notified was aware that the shut-down had taken place.

The lower water chamber on the right hand side of the No. 2 Worthington pumping engine developed a crack in the flange bolting to the valve deck casting. This crack is about eight inches in length and extends down about six inches below the flange, passing through the bolt hole. The course of the break was checked by drilling and tapping a hole at the end of the crack and inserting a plug therein. The flange was then strengthened by means of a band bolted around its outer edge. Further provision was made against leakage by inserting a patch on the inside of the discharge chamber. This crack occurs in what appears to be the strongest part of this casting and it is difficult to determine the causes which produced same.

Considerable trouble has been experienced with the floor tiling in this station, due apparently to the expansion and contraction caused by variations in the temperature and provision will have to be made to take up this expansion if the floor in this station is to be kept in a proper manner.

The weighing scale at this station is proving very unsatisfactory and cannot be relied upon for use. It will be necessary to provide a new scale at the earliest possible moment, in order to properly weigh the coal now being burned at the station.

RECOMMENDATIONS.

BOROUGHS OF MANHATTAN AND THE BRONX.

During the year just passed, the aim has been to bring the existing pumping plants up to as high a state of repair as possible and to put the same on a safe and reliable running basis. At the same time considerable study has been made of the best plan of procedure to meet the present existing conditions and the conditions which will probably exist between now and at the time when the major part of the high service area will be supplied direct, by water from the Catskill Mountains.

Numerous complaints of lack of pressure on the upper floors (fourth and higher) of the new modern, law tenement houses, which have now reached a height averaging between six and eight stories, and which are at present supplied by the Croton gravity service. These buildings are generally located on areas, the elevations of which are slightly above or below the line of demarcation between the Croton gravity service and the high service, this line being located in a plane sixty (60) feet above mean high water. This line was established by an ordinance passed by the Board of Aldermen of The City of New York on December 3, 1878, and approved by the Mayor on December 7, 1878, and reads as follows:

"Resolved, That the Commissioner of Public Works be and he hereby is authorized, under chapter 477, Laws of 1875, and as amended by chapter 386, Laws of 1878, to erect on the lots situated between Ninety-seventh and Ninety-eighth streets, and one hundred (100) feet west of Ninth avenue, and which lots were retained by the Commissioner of Public Works, under chapter 230, Laws of 1870, a suitable building, and to place therein two (2) pumping engines and fixtures, including a tank and standpipe; and to lay the necessary pipes to connect the same with Croton main leading from reser-

voir in Central Park, and with the distributing mains now laid, so as to supply water at higher elevations to buildings on that portion of Manhattan Island situated above the level of sixty feet above mean high tide, at a cost not exceeding the sum of two hundred and twenty thousand dollars."

The provision herein made was to supply water at higher elevations to all buildings situated on a level equal to or above sixty feet above mean high tide. This simply defines the high service zone, but does not specify the head of water that is to be maintained on the area of the zone.

As the elevation to which the City is legally bound to deliver water has never been definitely settled, it is questionable how far the Department can go in the matter of delivering water above the curb line.

In view of these facts, as the question is entirely a legal one, it seems to be advisable that an opinion be requested from the Corporation Counsel as to the legal obligations of this Department in the matter of the heights to which water must be furnished in public and private buildings.

The major part of the above mentioned complaints are from buildings in which the present Croton gravity service would easily supply the second and probably the third floors, but would thus necessitate the provision by the owner of ways and means to raise the water to the higher floors.

As each foot of elevation added to the lift of the water adds a fixed and definite amount of cost to the pumpage of same, it seems patent that the expense of the additional pumpage should be borne by the property which is thereby benefited and enhanced in value, and which is relieved of the added and very costly expense of private pumping. It is manifest that a fair and just method of providing water services to the areas in the elevations higher than that now supplied by gravity would be to endeavor, as near as it is practicable, to maintain above the lines of demarcation, a head which as a minimum would be equal to the average head now existing between the hydraulic grade of the Croton gravity supply and the average ground elevations in the areas supplied by that system. Whatever expenses are incurred in pumping water to points above this average height, should be directly charged to the properties benefited.

It is pertinent to add, that if these demands and also the demands due to the consumption caused by increasing population are to be properly met, provisions will have to be made at an early date for increasing the pumping capacity, as the capacity of the present plants will not be sufficient to meet the demands put upon them during the coming ten or twelve years, which is a conservative estimate of the time that will elapse until relief will have been received from the Catskill Mountains.

As stated in earlier reports, if the time of operation was to be extended over a period of approximately the life of a first-class pumping plant, say twenty years, a scheme of consolidation of all the pumping at a point to be located near the centre of gravity of the distribution system of the pumped service would be the most economical

plan from a maintenance and operating standpoint. This plan would necessarily involve the construction and installation of a new and modern pumping plant equipped with modern high duty pumping engines, boilers, economizers, coal handling plant, etc., costing in excess of $1,000,000 and requiring additional expenditures for the laying of many additional miles of large mains necessary to properly distribute the water.

For the limited time that the high service pumping plants will be in existence, where same may be accomplished economically, it will probably be much more advisable to increase the capacity of some of the present pumping plants by replacing the obsolete and uneconomical low duty pumps by pumping engines of the modern high duty type.

The point best adapted for beginning improvements under the existing circumstances, is in the Ninety-eighth street pumping station. This station is at present equipped with three pumping engines of the duplex, horizontal, compound, direct acting type and of the following capacities:

	Gallons.
Pumping engine No. 1	7,500,000
Pumping engine No. 2	7,500,000
Pumping engine No. 3	10,000,000

The lack of efficiency of the type of engine installed in this station is manifest from the published reports which show that the yearly duty is barely in excess of 55,000,000 foot-pounds of work per 100 pounds of coal used, the consumption being about 15 pounds of coal per million gallons of water lifted to a height of one foot.

The amount of coal used annually, in order to produce an average daily pumpage of 16,700,000 gallons, is over 3,600 tons, costing approximately $19,000.

The installation in this station at an expenditure of not more than $80,000 of one pumping engine having a capacity equal to or greater than that of the present average daily pumpage of this station, and of a type of engine similar to that now under contract to be constructed and installed in the Ridgewood pumping station, in the Borough of Brooklyn, and which will show either a test duty of not less than 140,000,000 foot-pounds of work per 100 pounds of coal burned, or a yearly duty which should not fall below 120,000,000 foot-pounds of work per 100 pounds of coal burned, with a consumption of not more than 7 pounds of coal per million gallons of water lifted to a height of one foot, would result in a yearly coal consumption of not more than 1,500 tons of coal, at an annual cost of about $8,000.

The saving on the coal alone by this engine would be more than $11,000 per annum.

As both the present pumping engines, Nos. 1 and 2, are of the low duty jet-condenser type, they are, in addition to being uneconomical very wasteful in operation, on account of the great amount of water required to supply the jet condenser as compared with that required to obtain the same end in the modern pumping engines. Approximately one of these engines runs daily throughout the year; the second engine

is run at not less than 15 per cent. of the time, and the amount of water used for condensing purposes and run off into the sewer will be not less than 250 gallons per minute or 350,000 gallons per day, which, at the metered rate of 10 cents per 100 cubic feet has a revenue of $50 per day, or $17,500 per annum.

Omitting the saving due to a reduction in the cost of handling a greatly reduced amount of coal the net annual saving on fuel and water would be about $28,500, an amount sufficient to pay off the cost of the installation of the pumping engine and its accessories in a comparatively few years.

By the installation of one unit as before mentioned two of the present pumping engines could be retained as reserve units only, as it would not be safe to rely upon them for regular and continuous service.

By removing pumping engines Nos. 1 and 2, and installing two units as above described, and of as large a capacity as the space in the present engine room will allow, rearranging the present suction and discharge piping and installing new boiler capacity at an expenditure which should not exceed $250,000, the present daily pumpage may be more than doubled while the annual charge for fuel and labor would practically remain the same; while on the other hand there would be the annual saving resulting from the sale of 350,000 gallons of water ordinarily used for jet condenser purposes and consigned to the sewer.

The installation of this plant will necessitate the making of the building as fireproof as possible, and will require the installation of a new fireproof engine room floor and at least the placing of a new fireproof roof on the present engine house and boiler room.

I therefore recommend that provision be immediately made to double or further increase the present capacity of this station by installing two modern high duty crank and fly wheel engines, with necessary boilers, additional suction and discharge mains, steam piping and other appurtenances complete.

One Hundred and Seventy-ninth Street Pumping Station.

In order to immediately improve the conditions at this station, plans are practically in readiness to build a new dock and to provide better facilities for receiving and handling the coal; to build separate discharge line from both the high service and the tower service engines; to strengthen the present discharge lines from said engines; to furnish and install new boilers, economizers and steam lines in the boiler room.

Plans are prepared for adjustable ventilators on the present monitors on the engine room.

High Bridge Pumping Station.

The High Bridge Pumping Station has been for many years held entirely in reserve and until the latter part of the last quarter banked fires only were maintained upon the boilers.

To keep the machinery in good running order, it was decided to operate this station daily at least during one eight-hour watch, and during that time practically 2,000,000 gallons have been pumped daily into the high service reservoir.

I therefore recommend that the necessary additional force be provided to put this station at a full running basis and that the station be operated daily through a full period of twenty-four hours.

Jerome Park Pumping Station.

This pumping station is the only station which furnishes the high service in the Borough of The Bronx and is at present equipped with two pumping engines of approximately 10,000,000 gallons daily capacity each and has been in regular operation for a period of practically two years.

During the past year the average daily pumpage at this station was over 9,350,000 gallons. It is evident from this that the consumption will shortly increase to such an amount that it will be necessary to keep both engines in active operation, leaving no engine in reserve.

I therefore recommend that provision be immediately made to install an engine of a capacity of about fifteen million gallons per day, to meet the demands which will come upon this station within the next year or two, due to increase in population and the further possible demands that may be put upon it for washing water to be used upon the filtering plant to be installed at Jerome Park Reservoir.

With the installation of this pumping engine will be required the installation of boiler capacity to operate the same. As the Borough of The Bronx is on the high service areas and is not provided with standpipe or reservoir capacity, I recommend that every means be provided to put this station in a position where it will be practically impossible for a breakdown to completely cut the high service areas out of their necessary supply of water. In order to obtain this end I deem it advisable to install in the discharge line from the present pumps, gate valves by which it will be possible to isolate the present standpipe from the system and also provide a second discharge line out of the station.

Plans have been prepared for the installation of adjustable ventilators on the monitors on the engine room at this station. Provisions should be made at this station to construct areaways which would provide natural ventilation in the basement.

At each of the pumping stations in the Boroughs of Manhattan and The Bronx, in order to properly check up the amount of coal burned and see that same corresponds with the weight of coal delivered at the station, I recommend that the bunkers be divided into two or more pockets, so as to facilitate the checking of same.

BOROUGH OF QUEENS.

First Ward, Pumping Station No. 1.

Ordinary repairs and renewals were made upon both the pumping engines at this station. The cylinders were lagged with a cover of 85 per cent. magnesia; new valve rods were put in place, and necessary changes made in drip, lubricator and indicator connections; and new suction piping was installed under the floor of the condensers.

The boiler feed pump and its piping were thoroughly overhauled.

A new steam line drain was put in and connected up to the drainage pump.

A new valve rod and guide and a new stuffing box were placed on the Blake condenser pump.

The boilers at this station are in first class shape, requiring but little repairing and renewal during the year.

A new cellar door was fitted in place and repairs were made to the engine room floor and to the roof, by the Department employees.

First Ward, Pumping Station No. 2.

This station was completely destroyed by an explosion several years ago, and since that time has been abandoned. Owing to the increasing scarcity of water in Long Island City, it was decided to rebuild this station, at least as a temporary pumping plant, at an expenditure approximating $5,500. Early in the second quarter, the spending of this amount of money was authorized by action of the Board of Aldermen and the work was pushed with diligence and at an expense as shown by the expenditures in detail below:

Contractor and Description of Work.	Amount.
Christopher Clifford, building foundations and setting boiler	$1,100 00
F. W. Vail, erecting frame building	1,311 00
H. R. Worthington, pumping engine	876 00
H. R. Worthington, air pump and condenser	490 00
H. R. Worthington, feed pump and receiver	140 00
Sweeney & Gray, smokestack	160 00
Robt. Sapp, raising and guying smokestack	85 00

Contractor and Description of Work.	Amount.
John Welden, carting boiler from Whitestone	40 00
Gould & Welden, altering suction tank	98 00
Gould & Welden, damper regulator	86 00
Jacob Haab, shaking grate bars	76 00
Jacob Haab, cleaning eight wells	798 00
Jacob Haab, cleaning one 16-inch well	250 00
	$5,510 00

Pending the delivery of check and gate valves for use on the discharge lines of the station, this station is being run temporarily practically every day, pumping out the wells in order to clean same and properly develop their yield, and will be ready to be thrown into regular service within a few days after the receipt of the above valves.

First Ward, Pumping Station No. 3.

Minor repairs were made to the pumping stations and auxiliary feed, vacuum and air pumps at this station.

A wooden casing was constructed around the lagging of engine No. 2 and connections were made from steam traps to feedwater heater, etc.

A new cast iron head was placed on one of the wells, and a steam line for the boiler tube cleaner was carried from pumping engine No. 1 to the front of the boiler.

But minor repairs were made to the boilers and their settings and to the building.

Third Ward, Flushing Pumping Station.

Except for repairing the crankpin and its box on the high pressure side of the No. 2 engine, which was injured by running hot, but few minor repairs have been made to the main pumps at this station.

Repairs have been made to the steam piping leading to the boilers and the feed pumps.

On boiler No. 1 repairs were made to the Mason governor and a new set of salamander shaking grates and new furnace door liners were installed on the boilers.

The work of installing the toilet system and also the incandescent light system was completed.

The work remaining at the beginning of the year under contract with James A. Stevenson, for building a new boiler house and placing a monitor on the engine house roof, has been completed.

Third Ward, Bayside Pumping Station.

After receiving a few ordinary repairs and being thoroughly painted and varnished, both the Blake pumping engine and the Holly pumping engine at this station are in good state of repair.

The Department employees have made necessary repairs to the steam-heating plant and to auxiliary steam piping in the engine house basement.

On the boilers the bridge walls were reset and boiler room doors and jambs were fitted and made tight and the grate bars were repaired and renewed where necessary.

The buildings, including the Engineman's dwelling, at this station are excellently maintained, and after being thoroughly painted and varnished present a very neat appearance.

The closets, toilets, drains, etc., at this station have been thoroughly overhauled and the sanitary conditions in and about the station are first class in every respect.

Third Ward, Whitestone Pumping Station.

Moderate repairs have been made to the main pumping engine and to the auxiliary, vacuum, air and boiler feed pumps at this station, as well as to the main steam, blow-off and other auxiliary piping. Repairs and renewals were also made to the receiver on the suction line of the condenser pump and of the damper regulator.

In the main pump a new set of valves and springs were installed.

BOROUGH OF RICHMOND.

Tottenville Pumping Station.

Minor repairs were made on the main pumps of this station and general repairs were made on the box and piston rods and auxiliary valves of the deep well pumps Nos. 3, 5, 6, 7, 8 and 9; and also new leathers were furnished and placed upon these pumps. Renewals were also made of the set screws and globe valves on these pumps.

A Venturi meter with recording gauge was ordered to be placed upon the discharge line from this station, so that a record of the pumpage from the deep well pumps, which were connected up so as to make direct delivery into the distribution system, might be obtained.

New bridge walls were built in the Babcock & Wilcox boiler at this station.

Safety valves were placed upon boilers Nos. 1 and 2 and parts of the main steam line leading from these boilers to the well pumps were renewed and repaired. Repairs were also made on the injector on the No. 1 boiler and on the feed and cold water lines.

A new 100-horsepower Goubert feedwater heater was furnished and installed.

Duty Reports for Quarter Ending December 31, 1906.

BOROUGHS OF MANHATTAN AND THE BRONX.

Ninety-eighth Street Pumping Station.

Total United States gallons pumped	1,425,586,313
Average per day	15,495,503
Average head, in feet	89.08
Millions gallons pumped against a head of 1 foot	126,988
Million foot-pounds of work	1,057,816
Total coal burned, pounds	2,018,626
Duty in foot-pounds per 100 pounds of coal	52,402,770

Cost of Pumping.

Payroll	$7,109 99
Fuel	4,948 07
Supplies	496 81
	$12,553 88
Repairs	$1,765 09
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.0989
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.1128

One Hundred and Seventy-ninth Street Pumping Station.

Tower Service, Pumps Nos. 1 and 3.

Total United States gallons pumped	383,678,379
Average per day	4,170,410
Average head in feet	230.98
Million gallons pumped against a head of 1 foot	88,622
Million foot-pounds of work	738,221

Reservoir Service, Pumps Nos. 2, 4, 5 and 6.

Total United States gallons pumped	3,268,762,537
Average per day	35,530,030
Average head, in feet	111.5
Million gallons pumped against a head of 1 foot	364,468
Million foot-pounds of work	3,036,018

Entire Station.

Total United States gallons pumped	3,652,440,916
Average per day	39,700,440
Average head, in feet	124.05
Million gallons pumped against a head of 1 foot	453,090
Million foot-pounds of work	3,774,240
Total coal burned, pounds	4,878,120
Duty in foot-pounds per 100 pounds of coal	77,370,790

Cost of Pumping.

Payroll	$11,787 57
Fuel	11,432 28
Supplies	806 15
	$24,025 90
Repairs	$1,872 68
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.0637
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.0687

High Bridge Pumping Station.

Total United States gallons pumped	107,528,614
Actual time of operation, days	19
Average per day	5,659,450
Average head, in feet	105.83
Million gallons pumped against a head of 1 foot	11,380
Million foot-pounds of work	94,793
Total coal burned, pounds	459,500
Duty in foot-pounds per 100 pounds of coal	20,629,597

Cost of Pumping.

Payroll	$1,259 58
Fuel	1,074 88
Supplies	45 44
	$2,379 90
Repairs	$9 00
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.2091
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.2099

Jerome Avenue Pumping Station.

Total United States gallons pumped	852,793,126
Average per day	9,269,491
Average head, in feet	182.85
Million gallons pumped against a head of 1 foot	155,936
Million foot-pounds of work	1,298,948
Total coal burned, pounds	1,530,090
Duty in foot-pounds per 100 pounds coal	84,893,633

Cost of Pumping.

Payroll	$4,942 55
Fuel	4,307 07
Supplies	281 14
	$9,543 76
Repairs	$1,753 06
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.0612
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.0724

BOROUGH OF QUEENS.

First Ward, Pumping Station No. 1.

Total United States gallons pumped	55,580,553
Average per day	604,136
Average head, or dynamic lift, in feet	152.24
Million gallons pumped against a head of 1 foot	8,462
Million foot-pounds of work	70,493
Total coal burned, pounds	337,665
Duty in foot-pounds per 100 pounds of coal	20,876,608

Cost of Pumping.

Payroll	$2,082 16
Fuel	964 74
Supplies	83 35
	$3,130 25
Repairs	191 63
Total	$3,321 88
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.3699
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.3925

First Ward, Pumping Station No. 3.

Total United States gallons pumped	57,285,228
Average per day	622,665
Average head, or dynamic lift, in feet	126.32
Million gallons pumped against a head of 1 foot	7,236
Million foot-pounds of work	60,275
Total coal burned, pounds	263,290
Duty in foot-pounds per 100 pounds of coal	22,893,007

Cost of Pumping.

Payroll	$2,082 16
Fuel	752 26
Supplies	59 49
	$2,893 91
Repairs	258 08
Total	$3,151 99
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.3999
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.4356

Third Ward, Flushing Pumping Station.

Total United States gallons pumped	163,830,972
Average per day	1,780,770
Average head, or dynamic lift, in feet	160.86

Million gallons pumped against a head of 1 foot	26,354
Million foot-pounds of work	219,533
Total coal burned, pounds	1,071,520
Duty in foot-pounds per 100 pounds of coal	20,487,990

Cost of Pumping.

Payroll	$2,074 15
Fuel	3,062 78
Supplies	199 92
	$5,336 85
Repairs	356 00
Total	$5,692 85
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.2025
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.2163

Third Ward, Bayside Pumping Station.

Total United States gallons pumped	84,269,459
Average per day	915,967
Average head, or dynamic lift, in feet	186.99
Million gallons pumped against a head of 1 foot	15,758
Million foot-pounds of work	131,263
Total coal burned, pounds	375,000
Duty in foot-pounds per 100 pounds of coal	35,003,460

Cost of Pumping.

Payroll	$2,088 18
Fuel	1,071 42
Supplies	70 83
	$3,230 43
Repairs	189 00
Total	$3,419 43
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.2050
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.2166

Third Ward, Whitestone Pumping Station.

Total United States gallons pumped	33,517,576
Average per day	364,322
Average head, or dynamic lift, in feet	201.2
Million gallons pumped against a head of 1 foot	6,738
Million foot-pounds of work	56,129
Total coal burned, pounds	211,309
Duty in foot-pounds per 100 pounds of coal	26,562,522

Cost of Pumping.

Payroll	$2,082 16
Fuel	603 71
Supplies	119 75
	$2,805 62
Repairs	90 50
Total	$2,896 12
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$0.4163
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$0.4439

BOROUGH OF RICHMOND.

Tottenville Pumping Station.

Total United States gallons pumped	17,902,099
Average per day	194,588
Average head, in feet	145.01
Million gallons pumped against a head of 1 foot	2,576
Million foot-pounds of work	21,621
Total coal burned, pounds	381,162
Duty in foot-pounds per 100 pounds of coal	5,672,391

Cost of Pumping.

Payroll	$1,971 00
Fuel	1,063 50
Supplies	107 87
	$3,142 37
Repairs	$29 00
Cost of pumping 1,000,000 gallons 1 foot (without repairs)	$1.2198
Cost of pumping 1,000,000 gallons 1 foot (with repairs)	$1.2311

BOROUGH OF MANHATTAN.

Pumping Station at Ninety-eighth Street.

Pumping Record.

1906.	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Coal Used, Duty, etc. Total Coal or Equivalent. In Pounds.	In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January..... February.... March.....	1,442,392,340	90.06	2,252,371	1,005.52	1,561.6	*....	$5 60
April..... May..... June.....	1,446,848,490	95.62	2,278,420	1,017.15	1,574.7	*....	5 60
July..... August..... September..	1,517,099,239	94.72	2,395,325	1,069.34	1,578.8	*....	5 60
October..... November.... December...	1,425,586,313	89.08	2,018,626	901.17	1,415.9	*....	5 45
Total.	5,831,924,042		8,944,742	3,993.18		*....	
Average		92.41			1,533.7	*....	$5 56
Aver. per day	15,977,870		24,506	10.94		*....	

*Egg size anthracite.

1906.	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumpage. Cost of Pumping Based on Cost of Coal Used.	Materials, Supplies and Repairs.	Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January, February, March	47,078,210	$5,630 92	$909 20	$6,801 18	$13,341 30	$0 1030
April, May, June	50,643,897	5,696 04	779 80	7,898 39	14,103 96	0 1039
July, August, September	49,972,870	6,016 08	978 13	6,867 50	13,851 71	0 0963
October, November, December	52,402,770	4,948 07	2,261 90	7,109 00	14,318 97	0 1128
Total.....		$22,291 11	$2,929 03	$28,666 07	$58,887 21	
Average	50,023,947					$0 1037
Average per day....		$61 07	$8 02	$78 53	$161 33	

Interest and Sinking Fund not included in cost of pumping.

Pumping Station at One Hundred and Seventy-ninth Street.

Pumping Record.

1906.	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Coal Used, Duty, etc. Total Coal or Equivalent. In Pounds.	In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January, February, March	3,764,824,489	228.09 105.09	5,652,183	2,523.0	1,501.31	*....	$5 38
April, May, June	3,523,677,550	228.29 106.08	4,983,024	2,224.5	1,414.15	*....	†6 03
July, August, September	3,321,108,667	229.88 110.53	4,511,308	2,014.1	1,358.37	*....	5 24
October, November, December	3,652,340,916	230.98 111.50	4,878,020	2,177.7	1,335.58	*....	5 24
Total.	14,262,351,622		20,025,535	8,939.3		*....	
Average					1,404.08	*....	$5 30
Aver. per day	39,074,937		54,864	24.5		*....	

*Egg size anthracite. †Cost of extra carting included.

1906.	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumpage. Cost of Pumping Based on Cost of Coal Used.	Materials, Supplies and Repairs.	Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January, February, March	76,521,090	$13,572 19	$3,228 26	$10,868 42	$27,668 87	$0 0570
April, May, June	78,325,040	13,409 82	2,752 69	13,409 82	29,572 33	0 0655
July, August, September	77,042,980	10,569 03	2,044 23	10,580 50	23,193 76	0 0556
October, November, December	77,370,790	11,432 28	2,678 83	11,787 57	25,898 58	0 0687
Total		$48,983 32	$10,704 01	$46,646 32	$106,333 64	
Average	77,314,975					$0 0588
Average per day		$134 20	$29 32	$127 79	$292 53	

Interest and Sinking Fund not included in cost of pumping.

BOROUGH OF THE BRONX.

Pumping Station at Jerome Avenue.

Pumping Record.

1906.	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Coal Used, Duty, etc. Total Coal or Equivalent. In Pounds.	In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January, February, March	852,934,630	177.16	1,544,514	689.52	1,810.83	*....	$6 32
April, May, June	843,916,720	181.48	1,493,640	666.80	1,769.89	*....	6 32

1906.	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Coal Used, Duty, etc. Total Coal or Equivalent. In Pounds.	In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
July..... August..... September..	874,238,487	181.99	1,553,520	693.53	1,776.98	*....	6 32
October..... November.... December...	852,793,126	182.85	1,530,090	683.43	1,795.16	*....	6 32
Total.	3,423,882,963		6,121,764	2,733.28		*....	
Average		180.01			1,787.95	*....	$6 32
Aver. per day	9,353,104		16,771	7.49		*....	

* Egg size anthracite.

1906.	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumpage. Cost of Pumping Based on Cost of Coal Used.	Materials, Supplies and Repairs.	Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January..... February..... March.....	82,207,660	$4,357 73	$857 27	$5,158 03	$10,373 03	$0 0680
April..... May..... June.....	85,515,736	4,214 18	427 41	5,812 80	10,454 39	0 0684
July..... August..... September.....	85,312,119	4,383 11	662 56	5,624 45	10,670 12	0 0671
October..... November..... December.....	84,893,633	4,307 07	2,034 20	4,942 55	11,283 82	0 0724
Total.....		$17,262 09	$3,981 44	$21,537 83	$42,781 36	
Average	84,982,787					$0 0689
Average per day.....	1.	$47 29	$10 91	$59 00	$116 88	

Interest and Sinking Fund not included in cost of pumping.

BOROUGH OF QUEENS.

Pumping Station No. 1.

Pumping Record.

1906.	Coal Used, Duty, etc.						
	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Total Coal or Equivalent. In Pounds.	Total Coal or Equivalent. In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January, February, March	58,754,079	165.64	381,095	170.13	648.62	*....	$7 30
April, May, June	55,671,776	152.84	342,905	153.08	615.94	*....	7 42
July, August, September	55,195,210	148.68	346,990	154.90	628.66	*....	7 42
October, November, December	55,580,553	152.24	337,665	150.74	607.52	*....	6 40
Total.	225,201,618		1,408.655	628.85		*....	
Average		155.72			625.50	*....	$7 14
Aver. per day	616,990		3.859	1.72		*....	

* Egg size anthracite.

1906.	Cost of Pumpage.					
	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumping Based on Cost of Coal Used.	Cost of Pumping Based on Materials, Supplies and Repairs.	Cost of Pumping Based on Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January, February, March	21,309,560	$1,243 41	$53 13	$2,073 86	$3,370 40	$0 3449
April, May, June	20,696,078	1,136 85	50 60	2,201 37	3,387 82	0 4004
July, August, September	19,989,625	1,149 43	67 69	2,077 40	3,294 52	0 3956
October, November, December	20,876,608	964 74	274 98	2,082 16	3,321 88	0 3925
Total.....		$4 493 43	$446 40	$8,434 79	$13,374 62	
Average	20,717,871					$0 3812
Average per day.....		$12 31	$1 22	$22 87	$36 60	

Interest and Sinking Fund not included in cost of pumping.

Pumping Station No. 3.

Pumping Record.

1906.	Coal Used, Duty, etc.						
	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Total Coal or Equivalent. In Pounds.	Total Coal or Equivalent. In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January.... February.... March.....	55,459,322	163.93	276,001	123.21	4,976.6	*....	$7 32
April..... May June.....	65,537,985	138.36	279,926	124.96	4,271.2	*....	7 42
July..... August..... September..	81,457,553	131.74	266,180	118.83	3,267.7	*....	7 42
October..... November... December...	57,285,228	126.32	263,290	117.54	4,596.1	*....	6 40
Total.	259,740,068		1,085,397	484.54		*....	
Average		137.20			4,178.7	*....	$7 14
Ave. per day.	711,616		2,973	1.33		*....	

* Egg size anthracite.

1906.	Cost of Pumpage.					
	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumping Based on Cost of Coal Used.	Cost of Pumping Based on Materials, Supplies and Repairs.	Cost of Pumping Based on Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January..... February..... March.....	27,640,677	$901 98	$70 42	$1,863 86	$2,836 26	$0 3293
April..... May June.....	26,993,173	927 25	49 86	1,991 37	2,968 48	0 3265
July..... August..... September.....	33,582,910	881 71	91 79	2,077 40	3,050 90	0 2843
October..... November..... December.....	22,893,007	752 26	317 57	2,082 16	3,151 99	0 4356
Total.....		$3,463 20	$520 64	$8,014 70	$12,007 63	
Average	27,777,442					$0 3368
Average per day.....		$9 40	$1 44	$21 95	$32 88	

Interest and Sinking Fund not included in cost of pumping.

Pumping Station at Flushing.

Pumping Record.

1906.	Coal Used, Duty, etc.						
	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Total Coal or Equivalent. In Pounds.	Total Coal or Equivalent. In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January..... February..... March.....	139,558,563	176.38	904,713	403.88	6,482.7	*....	$7 19
April..... May..... June.....	121,263,486	179.19	953,650	425.73	7,864.3	*....	7 42
July..... August..... September..	152,149,528	217.35	1,013,270	452.35	6,659.7	*....	7 42
October..... November..... December...	163,830,972	160.86	1,071,520	478.35	6,540.4	*....	6 40
Total.	576,802,549		3,943.153	1,760.31		*....	
Average		182.96			6,836.2	*....	$7 09
Ave. per day.	1,580,281		10,893	4.82		*....	

* Egg size anthracite.

1906.	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumpage. Cost of Pumping Based on Cost of Coal Used.	Materials, Supplies and Repairs.	Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January..... February..... March.....	22,466,601	$2,904 31	$343 83	$2,129 51	$5,377 65	$0 2205
April..... May..... June.....	19,004,955	3,158 94	289 67	2,224 93	5,673 54	0 2657
July..... August..... September.....	27,186,238	3,356 40	379 32	2,069 40	5,805 12	0 1755

1906.	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumpage. Cost of Pumping Based on Cost of Coal Used.	Materials, Supplies and Repairs.	Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
October..... November..... December.....	20,487,990	3,062 78	565 92	2,074 15	5,702 85	0 2163
Total.....		$12,482 43	$1,578 74	$8,497 99	$22,559 16	
Average	22,286,486					$0 2138
Average per day.....		$34 20	$4 30	$23 28	$61 78	

Interest and Sinking Fund not included in cost of pumping.

Pumping Station at Bayside.

Pumping Record.

1906.	United States Gallons Pumped.	Coal Used, Duty, etc. Average Total Dynamic Lift in Feet.	Total Coal or Equivalent. In Pounds.	In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January..... February.... March.....	74,246,591	183.65	339,266	151.46	4,569.44	*....	$7 27
April..... May..... June.....	83,301,671	198.58	360,100	160.75	4,322.84	*....	7 42
July..... August..... September..	82,006,144	187.89	360,700	161.02	4,398.45	*....	7 42
October..... November.... December...	84,269,459	186.99	375,000	167.41	4,450.01	*....	6 40
Total.	323,823,865		1,435,086	640.64		*....	
Average		192.35			4,431.62	*....	$7 12
Aver. per day	887,188		3,932	1.75		*....	

*Egg size anthracite.

1906.	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumpage. Cost of Pumping Based on Cost of Coal Used.	Materials, Supplies and Repairs.	Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January, February, March	36,227,374	$1,101 76	$54 88	$1,863 95	$3,020 59	$0 2046
April, May, June	37,888,642	1,192 82	63 50	2,003 03	3,259 35	1992
July, August, September	35,583,587	1,194 81	183 16	2,083 40	3,461 37	2246
October, November, December	35,003,460	1,071 42	259 83	2,088 18	3,419 43	2166
Total		$4,560 81	$561 37	$8,038 56	$13,160 74	
Average	36,178,766					$0 2114
Average per day		$12 49	$1 53	$22 02	$36 04	

Interest and Sinking Fund not included in cost of pumping.

Pumping Station at Whitestone.

Pumping Record.

1906.	United States Gallons Pumped.	Coal Used, Duty, etc. Average Total Dynamic Lift in Feet.	Total Coal or Equivalent. In Pounds.	In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January, February, March	24,489,372	179.25	184,107	82.19	7,517.8	*....	$7 33
April, May, June	25,085,725	188.56	180,387	80.53	7,190.8	*....	7 42
July, August, September	38,856,020	199.65	209,771	93.64	5,398.6	*....	7 42
October, November, December	33,517,576	201.20	211,309	94.33	6,304.4	*....	6 40
Total.	121,948,693		785,574	350.69		*....	
Average		193.96			6,441.8	*....	$7 12
Aver. per day	334,106		2,152	.96		*....	

*Egg size anthracite.

1906.	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumpage. Cost of Pumping Based on Cost of Coal Used.	Materials, Supplies and Repairs.	Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January, February, March	19,870,887	$602 62	$55 03	$1,681 15	$2,338 80	$0 5342
April, May, June	21,870,011	597 53	59 16	1,732 85	2,389 54	4998
July, August, September	30,805,490	694 87	102 28	2,077 40	2,874 55	3705
October, November, December	26,562,522	603 71	210 25	2,082 16	2,896 12	1298
Total		$2,498 73	$426 72	$7,573 56	$10,409 01	
Average	24,777,277					$0 4439
Average per day		$6 84	$1 27	$20 74	$28 85	

Interest and Sinking Fund not included in cost of pumping.

BOROUGH OF RICHMOND.

Pumping Station at Tottenville.

Pumping Record.

1906.	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Coal Used, Duty, etc. Total Coal or Equivalent. In Pounds.	In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
January, February, March	19,215,776	136.36	383,910	171.38	19,978.00	*....	$6 25
April, May, June	18,900,941	143.42	342,249	152.78	18,107.00	*....	6 25
July, August, September	20,246,178	140.62	350,238	156.35	17,298.00	*...	6 25

1906.	Coal Used, Duty, etc.						
	United States Gallons Pumped.	Average Total Dynamic Lift in Feet.	Total Coal or Equivalent. In Pounds.	Total Coal or Equivalent. In Gross Tons.	Pounds of Coal Used Per Million Gallons.	Quality of Coal.	Cost of Coal Per Gross Ton.
October..... November.... December...	17,902,099	145.01	381,162	170.16	21,291.00	*....	6 25
Total.	76,264,994		1,457,559	650.67		*....	
Average		137.79			19,111.00	*....	$6 25
Aver. per day	208,945		3,993	1.78		*....	

*Egg size anthracite.

1906.	Average Duty in Foot Pounds Per 100 Pounds of Coal.	Cost of Pumpage. Cost of Pumping Based on Cost of Coal Used.	Materials, Supplies and Repairs.	Salaries.	Total Cost of Pumping.	Cost of Pumping One Million Gallons Against One Foot-Head.
January..... February..... March.....	5,687,998	$1,071 13	$438 49	$1,421 70	$2,931 32	$1 1063
April..... May..... June.....	6,610,943	954 93	416 67	1,536 90	2,908 50	1 0728
July..... August..... September.....	6,771,109	983 19	228 38	1,678 00	2,889 57	1 0149
October..... November..... December.....	5,672,391	1,063 50	136 87	1,971 00	3,171 37	1 2311
Total		$4,072 75	$1.220 41	$6.607 60	$11,900 76	
Average	6,185,616					$1 1037
Average per day.....		$11 15	$3 34	$18 10	$32 60	

Interest and Sinking Fund not included in cost of pumping.

Performance of Pumping Stations, 1906, Boroughs

BOROUGHS OF MANHATTAN

Pumping Station.	Total U. S. Gallons Pumped During Year.	Average U. S. Gallons Pumped Per Day.	Average Total Dynamic Lift in Feet.	Million Gallons Pumped Against 1-foot Head.
Ninety-eighth Street	5,831,924,000	15,977,870	92.41	538,946
One Hundred and Seventy-ninth Street High Service	12,020,434,366	32,932,695	108.13	1,299,834
One Hundred and Seventy-ninth Street Tower Service	2,241,917,256	6,142,239	228.98	513,359
Jerome Avenue	3,423,882,963	9,353,104	180.01	619,038
Total	23,518,158,585	64,433,309		2,971,177
Average			152.37	
Average per day	64,433,309			8,142

BOROUGHS OF MANHATTAN

	Cost of Pumping, Based on					
	Quality of Coal.	Average Cost of Coal Per Gross Ton.	Total Cost of Coal Used.	Repairs.	Supplies and Maintenance.	Salaries.
Ninety-eighth Street	*	$5 56	$22,291 11	$3,102 46	$1,826 '57	$28,666 07
One Hundred and Seventy-ninth Street High Service	*	5 30	48,983 32	7,193 65	3,510 36	46,646 31
One Hundred and Seventy-ninth Street Tower Service	*	6 32	17,262 09	2,392 74	1,588 70	21,537 83
Total	*		$88,536 52	$12,688 85	$6,925 63	$96,850 21
Average	*	$5 69				
Average per day	*		$243 81	$34 73	$18 97	$265 34

* Egg size anthracite.

of Manhattan, The Bronx, Queens and Richmond.

AND THE BRONX.

Total Foot-pounds of Work Done.	Coal, or Equivalent Used.		Average Duty.		
	In Pounds.	In Gross Tons.	In Gallons of Water Pumped Against 1-foot Head Per Pound of Coal.	In Pounds of Coal Used Per Million Gallons Pumped Against 1-foot Head.	In Foot-pounds Per 100 Pounds of Coal.
4,491,618	8,944,742	3,993	60,253	16.60	50,023,947
10,892,553 4,310,800	20,025,535	8,939	90,544	11.04	77,314,975
5,162,210	6,121,764	2,733	101,121	9.89	84,982,787
24,857,181	35,092,041	15,621			
.....			83,972	12.51	70,773,903
68,101	96,142	43			

AND THE BRONX.

Total Cost of Pumpage.	Average Cost of Pumping One Million Gallons Against Head of 1 Foot, Based on:					Cost of One Million Gallons Delivered into Distribution System.
	Total Cost.	Cost of Coal Used.	Cost of Repairs.	Cost of Supplies and Maintenance.	Salaries.	
$55,888 21	$0 1037	$0 0414	$0 0058	$0 0034	$0 0531	$9 58
106,333 64	0588	0273	0039	0019	0257	7 49
42,781 36	0691	0279	0039	0026	0347	12 49
$205,001 21						
.....	$0 0708	$0 0322	$0 0045	$0 0026	$0 0378	$9 85
$562 89						

BOROUGH OF

Pumping Station.	Total U. S. Gallons Pumped During Year.	Average U. S. Gallons Pumped Per Day.	Average Total Dynamic Lift in Feet.	Million Gallons Pumped Against 1-foot Head.
First Ward—				
Station No. 1	225,201,618	616,991	155.72	35,069
Station No. 3	259,740,068	711,616	137.20	35,637
Third Ward—				
Flushing	576,802,543	1,580,281	182.96	105,532
Bayside	323,823,865	887,188	192.35	62,286
Whitestone	121,948,693	364,106	193.96	23,654
Total	1,507,514,787	4,130,177		262,158
Average			172.44	
Average per day	4,130,177			718

BOROUGH OF

	Cost of Pumping, Based on					
	Quality of Coal.	Average Cost of Coal Per Gross Ton.	Total Cost of Coal Used.	Repairs.	Supplies and Maintenance.	Salaries.
First Ward—						
Station No. 1	†.....	$7 14	$4,493 43	$233 58	$212 82	$8,434 79
Station No. 3	†.....	7 14	3,463 20	312 45	217 19	8,014 79
Third Ward—						
Flushing	†.....	7 09	12,482 43	820 25	758 49	8,497 99
Bayside	†.....	7 12	4,560 81	314 80	246 57	8,038 56
Whitestone	†.....	7 12	2,498 60	156 84	269 88	7,573 56
Total	†.....		$27,498 60	$1,837 92	$1,704 95	$40,559 69
Average	†.....	$7 11				
Average per day	†.....		$71 16	$5 04	$4 67	$111 12

† Egg size anthracite.

QUEENS.

Total Foot-pounds of Work Done.	Coal, or Equivalent Used.		Average Duty.		
	In Pounds.	In Gross Tons.	In Gallons of Water Pumped Against 1-foot Head Per Pound of Coal.	In Pounds of Coal Used Per Million Gallons Pumped Against 1-foot Head.	In Foot-pounds Per 100 Pounds of Coal.
292,019	1,409,655	629	24,895	40.17	20,717,871
301,515	1,085,397	485	32,833	30.69	27,777,442
879,483	3,943,153	1,760	26,763	37.36	22,286,446
517,119	1,435,086	641	43,403	23.04	36,178,766
196,785	785,574	351	30,110	33.21	24,777,227
2,186,921	8,657,865	3,866			
.....			31,600	26.89	26,346,950
5.991	23,720	10.5			

QUEENS.

Total Cost of Pumpage.	Average Cost of Pumping One Million Gallons Against Head of 1 Foot, Based on					Cost of One Million Gallons Delivered into Distribution System.
	Total Cost.	Cost of Coal Used.	Cost of Repairs.	Cost of Supplies and Maintenance.	Salaries.	
$13,374 62	$0 3812	$0 1279	$0 0067	$0 0061	$0 2405	$59 38
12,007 63	3368	0971	0087	0061	2249	46 23
22,559 16	2138	1186	0077	0071	0804	39 71
13,160 74	2114	0733	0051	0040	1290	40 64
10,499 01	4439	1056	0066	0116	3201	82 40
$71,601 16						
.....	$0 3173	$0 1045	$0 0069	$0 0070	$0 1989	$52 67
$192 04						

Pumping Station.	Total U. S. Gallons Pumped During Year.	Average U. S. Gallons Pumped Per Day.	Average Total Dynamic Lift in Feet.	Million Gallons Pumped Against 1-foot Head.
Tottenville	76,264,994	208,945	137.79	10,784
Average per day	214,425			30

	Cost of Pumping, Based on					
	Quality of Coal.	Average Cost of Coal Per Gross Ton.	Total Cost of Coal Used.	Repairs.	Supplies and Maintenance.	Salaries.
Tottenville	*	$6 33	$4,072 75	$793 69	$426 72	$6,607 66
Average per day				$2 17	$1 17	$18 10

* Egg size anthracite.

Pumping Station.	Total U. S. Gallons Pumped During Year.	Average U. S. Gallons Pumped Per Day.	Average Total Dynamic Lift in Feet.	Million Gallons Pumped Against 1-foot Head.
Total	25,103,928,306	68,777,800		3,244,119
Average			178.83	
Average per day	68,777,800			8,888

RICHMOND.

Total Foot-pounds of Work Done.	Coal, or Equivalent Used.		Average Duty.		
	In Pounds.	In Gross Tons.	In Gallons of Water Pumped Against 1-foot Head Per Pound of Coal.	In Pounds of Coal Used Per Million Gallons Pumped Against 1-foot Head.	In Foot-pounds Per 100 Pounds of Coal.
89,782	1,457,559	651	7,399	135.85	6,185,616
245	3,993	1.7			

RICHMOND.

Total Cost of Pumpage.	Average Cost of Pumping One Million Gallons Against Head of 1 Foot, Based on					Cost of One Million Gallons Delivered into Distribution System.
	Total Cost.	Cost of Coal Used.	Cost of Repairs.	Cost of Supplies and Maintenance.	Salaries.	
$11,900 76	$1 1037	$0 3776	$0 0737	$0 0395	$0 6127	$152 60
$32 62						

MARY.

Total Foot-pounds of Work Done.	Coal, or Equivalent Used.		Average Duty.		
	In Pounds.	In Gross Tons.	In Gallons of Water Pumped Against 1-foot Head Per Pound of Coal.	In Pounds of Coal Used Per Million Gallons Pumped Against 1-foot Head.	In Foot-pounds Per 100 Pounds of Coal.
27,133,884	45,207,465	20,182			
.....			46,367	33.09	38,915,785
74,339	123,856	55			

SUM

	Cost of Pumping, Based on					
	Quality of Coal.	Average Cost of Coal Per Gross Ton.	Total Cost of Coal Used.	Repairs.	Supplies and Maintenance.	Salaries.
Total.....	*.....		$120,107 87	$15,321 46	$9,057 30	$144,017 50
Average		$5 89				
Average per day.....			$326 12	$41 97	$24 81	$394 57

* Egg size anthracite.

MARY.

Total Cost of Pumpage.	Average Cost of Pumping One Million Gallons Against Head of 1 Foot, Based on					Cost of One Million Gallons Delivered into Distribution System.
	Total Cost.	Cost of Coal Used.	Cost of Repairs.	Cost of Supplies and Maintenance.	Salaries.	
$288,503 15						
.....	$0 3248	$0 1107	$0 0139	$0 0091	$0 1911	$49 90
$787 48						

HIGH PRESSURE FIRE SERVICE.

Work on the contracts with the Continental Asphalt Paving Company for laying the high pressure mains in the three districts was begun in the Northern District in May, 1906, later in the Middle District and subsequently in the Southern District; the end of the year shows the Northern District almost completed, the Middle District well under way and the Southern District just started.

The work completed to end of year is as follows:

Northern District.

Pipe 12 Inches in Diameter.

Seventh avenue, between West Eleventh and West Thirteenth streets.
Eleventh avenue, between Twenty-first and Twenty-third streets.
Greenwich avenue, between West Eleventh and West Thirteenth streets.
University place, between West Eleventh and West Fourteenth streets.
Waverly place, between West Eleventh and Bank streets.
Bleecker street, between West Eleventh and Bank streets.
Washington street, between West Eleventh and Little West Twelfth streets.
Bank street, between Hudson street and Waverly place.
Bethune street, between West and Hudson streets.
Jane street, between West and Hudson streets.
Gansevoort street, between West and Little West Twelfth streets.
Little West Twelfth street, between Tenth avenue and Washington street.
Twelfth street, between Third and Seventh avenues.
Fourteenth street, between Union Square West and Tenth avenue.
Fifteenth street, between Union Square West and Tenth avenue.
Sixteenth street, between Union Square West and Fifth avenue.
Sixteenth street, between Seventh and Tenth avenues.
Seventeenth street, between Tenth avenue and Hudson River.
Seventeenth street, between Broadway and Seventh avenue.
Eighteenth street, between Broadway and Seventh avenue.
Nineteenth street, between Tenth avenue and Hudson River.
Nineteenth street, between Broadway and Fifth avenue.
Twentieth street, between Broadway and Seventh avenue.
Twenty-first street, between Broadway and Fifth avenue.
Twenty-first street, between Tenth and Eleventh avenues.
Twenty-second street, between Tenth and Eleventh avenues.
Twenty-second street, between Broadway and Seventh avenue.

Total linear feet of 12-inch pipe laid..... 41,368

Pipe 16 Inches in Diameter.

Fifth avenue, between Eleventh and Thirteenth streets.

West street, between Gansevoort and West Eleventh streets.

Sixteenth street, between Fifth and Seventh avenues.

Nineteenth street, between Fifth and Seventh avenues.

Twenty-first street, between Fifth and Seventh avenues.

Total linear feet of 16-inch pipe laid..... 8,433

Pipe 20 Inches in Diameter.

Seventh avenue, between Thirteenth and Twenty-second streets.

Thirteenth street, between West Fourth street and Tenth avenue.

Twenty-third street, between Fifth and Eleventh avenues.

West Fourth street, between West Eleventh and Thirteenth streets.

Total linear feet of 20-inch pipe laid..... 10,010

Pipe 24 Inches in Diameter.

Third avenue, between Eleventh and Fourteenth streets.

Fifth avenue, between Thirteenth and Twenty-third streets.

Gansevoort Market, between Pumping Station and Little West Twelfth street (2 lines).

Gansevoort street, between Little West Twelfth and Thirteenth streets.

Little West Twelfth street, between Washington and Gansevoort streets.

Thirteenth street, between Third avenue and Gansevoort street.

Total linear feet of 24-inch pipe laid..... 11,085

Total linear feet of mains laid in Northern District..... 70,896
Total linear feet of 8-inch hydrant connection laid..... 4,970
Total linear feet of 6-inch blow-off pipe laid..... 240

Total linear feet of pipe, all sizes, laid in Northern District..... 76,106

Middle District.

Pipe 12 Inches in Diameter.

Sixth avenue, between Eighth and Ninth streets.

Greenwich avenue, between Christopher and West Eleventh streets.

Waverly place, between Christopher street and Broadway.

Washington place, between University place and Broadway.
University place, between West Fourth and West Eleventh streets.
Wooster street, between West Fourth and Bleecker streets.
Mercer street, between Eighth and Bleecker streets.
Bleecker street, between Morton street and Broadway.
Charles street, between Greenwich avenue and West Fourth street.
Eighth street, between Sixth avenue and Broadway.
Tenth street, between Third avenue and Greenwich avenue.
Eleventh street, between Broadway and Waverly place.
Eleventh street, between Third and Fourth avenues.
West Third street, between Thompson and Lafayette streets.

Total linear feet of 12-inch pipe laid..... 25,590

Pipe 16 Inches in Diameter.

Fifth avenue, between Waverly place and West Eleventh street.
West street, between Spring and West Eleventh streets.
West Houston street, between Hudson and West streets.
West Eleventh street, between Hudson and West streets.
Christopher street, between Sixth avenue and West street.
Ninth street, between Fourth and Sixth avenues.

Total linear feet of 16-inch pipe laid..... 12,507

Pipe 20 Inches in Diameter.

West Fourth street, between Sixth avenue and West Eleventh street.

Total linear feet of 20-inch pipe laid..... 1,920

Pipe 24 Inches in Diameter.

Third avenue, between Tenth and Eleventh streets.

Total linear feet of 24-inch pipe laid..... 400

Total linear feet of mains laid in Middle District..... 40,417
Total linear feet of 8-inch hydrant connection laid..... 1,300
Total linear feet of 6-inch blow-off pipe laid..... 20

Total linear feet of pipe, all sizes, laid in Middle District..... 41,737

Southern District.

Total linear feet of 16-inch pipe laid..... 50

Total linear feet of all sizes of pipe laid in all three districts..... 117,893

Gate Valves and Hydrants Set.

	Northern District.	Middle District.	Southern District.	Total, All Districts.
20-inch gate valves set	63	8	..	71
16-inch gate valves set	22	36	1	59
12-inch gate valves set	116	102	..	218
8-inch gate valves set	267	89	..	356
6-inch gate valves set	11	2	..	13
4-nozzle post hydrants set	215	79	..	294

Cost.

	Northern District.	Middle District.	Southern District.	Total, All Districts.
Contract price	$870,709 75	$917,330 50	$1,036,242 50	$2,824,282 75
Estimate to December 31, 1906	703,105 95	381,873 85	58,176 50	1,143,156 30
To complete contract	$167,603 80	$535,456 65	$978,066 00	$1,681,126 45

Total number of tons straight pipe furnished	15,937
Total number of tons special castings furnished	2,819
Total number of gate valves received	1,401
Total number of hydrants delivered (not set)	782
Total number of hydrants ready for delivery	114

Pipe Tests.

Pipe Line, 12 Inches Diameter; Tested for Pressure of 450 Pounds Per Square Inch; Duration, Ten Minutes.

Date.	Section Tested.	Linear Feet of Pipe Line.	Linear Feet of Joints.	Allowable Leakage in Gallons.	Actual Leakage in Gallons.
July 5	Fifteenth street, from Ninth avenue to middle of block, Eighth to Seventh avenue	1,315	432.2	12.05	1.84
July 7	Fifteenth street, from Seventh avenue to middle of block, Seventh to Eighth avenue	419	139.2	3.87	1.96
July 10	Fifteenth street, from Ninth to Tenth avenue	900	299.3	8.31	7.02

Date.	Section Tested.	Linear Feet of Pipe Line.	Linear Feet of Joints.	Allowable Leakage in Gallons.	Actual Leakage in Gallons.
July 19	Seventeenth street, from Tenth avenue to dead end at river	373	151.7	4.21	3.68
July 20	Fifteenth street, from Seventh avenue to middle of block, Seventh to Sixth avenue	704	181.0	5.03	1.72
July 27	Twenty-second street, from Eleventh avenue to middle of block, Eleventh to Tenth avenue	513	164.3	4.56	4.36
July 30	Twenty-second street, from Tenth avenue to middle of block, Tenth to Eleventh avenue	285	100.4	2.79	2.19
July 31	*Eleventh avenue and Twenty-first street, from Eleventh avenue and Twenty-second street to Tenth avenue and Twenty-first street	1,052	373.6	10.38	7.59
Aug. 3	Bank street, from West Fourth street to Waverley place	424	148.7	4.13	1.72
Aug. 4	Waverley place and West Eleventh street, from Bank street to Greenwich avenue	439	184.3	5.12	3.22
Aug. 11	Greenwich avenue, from Eleventh street to Jane street	565	254.5	7.07	4.03
Aug. 11	Fourteenth street, from Washington street to Ninth avenue	471	163.2	4.53	1.84
Aug. 14	Sixteenth street, from Seventh avenue to gate between Seventh and Eighth avenues	513	142.3	3.95	1.61
Aug. 25	Twenty-second street, from Fifth to Sixth avenue	894	348.5	9.68	5.87
Aug. 28	Bank street, from Hudson street to West Fourth street	556	221.0	6.14	5.06
Aug. 29	Twelfth street, from middle of block, Fifth to Sixth avenue, to middle of block, Sixth to Seventh avenue	718	281.7	7.82	6.47
Sept. 25	Charles street and Greenwich avenue, from West Fourth to West Eleventh street.	1,229	481.7	13.38	9.00
Oct. 2	Twenty-second street, from Seventh avenue to gate between Sixth and Seventh avenues	478	172.7	4.80	2.22
Oct. 2	Twenty-second street, from Sixth avenue to gate between Sixth and Seventh avenues	467	178.9	4.97	4.55
Oct. 9	Fifteenth street, from Fifth avenue to Sixth avenue	987	321.5	8.93	8.20
Oct. 30	Twentieth street, from Seventh avenue to gate between Sixth and Seventh avenues	606	175.8	4.88	1.78
Nov. 7	Seventeenth street, from Seventh avenue to middle of block, Sixth to Seventh avenue	573	200.0	5.55	6.45
Nov. 12	Fourteenth street, from middle of block, Seventh to Eighth avenue, to middle of block, Eighth to Ninth avenue	855	291.1	8.08	1.11
Nov. 13	Fourteenth street, from middle of block, Eighth to Ninth avenue, to middle of block, Ninth to Tenth avenue	1,021	465.0	12.91	7.95
Nov. 15	Fourteenth street, from Fifth avenue to University place	515	175.9	4.88	4.67
Nov. 16	Fourteenth street, middle third of block from Fifth to Sixth avenue	233	143.5	3.99	1.49
Nov. 17	Fourteenth street, westerly third of block from Fifth to Sixth avenue	381	92.1	2.56	0.72
Nov. 21	Fifteenth street, from Fifth avenue to Broadway	530	181.2	5.03	2.55
Nov. 24	Seventeenth street, from Fifth avenue to Broadway	524	189.5	5.26	3.12
Nov. 24	Nineteenth street, from Fifth avenue to Broadway	372	125.6	3.50	2.67
Dec. 11	Fourteenth street, from Seventh avenue to middle of block, Sixth to Seventh avenue	456	122.7	3.41	2.56
Dec. 13	Sixteenth street, from Fifth avenue to Broadway	521	184.2	5.11	3.45

Date.	Section Tested.	Linear Feet of Pipe Line.	Linear Feet of Joints.	Allowable Leakage in Gallons.	Actual Leakage in Gallons.
Dec. 14	Twentieth street, from Fifth avenue to Broadway	313	102.6	2.85	1.45
Dec. 21	Fourteenth street, from gate west of Sixth avenue to first gate east of Sixth avenue	852	193.6	5.38	4.45
Dec 22	Fourteenth street, from Sixth avenue to first gate west of Sixth avenue	453	165.4	4.59	1.78
Dec. 29	Eighteenth street, from Fifth avenue to Sixth avenue	880	289.9	8.05	7.95
Dec. 29	Twentieth street, from Fifth avenue to Sixth avenue	923	361.0	10.01	8.57

* Gate at Eleventh avenue and Twenty-first street not closed.

Pipe Line, 16 Inches Diameter; Tested for Pressure of 450 Pounds Per Square Inch; Duration, Ten Minutes.

Date.	Section Tested.	Linear Feet of Pipe Line.	Linear Feet of Joints.	Allowable Leakage in Gallons.	Actual Leakage in Gallons.
Oct. 8	Sixteenth street, from Sixth avenue to gate between Sixth and Seventh avenues	520	262.8	7.30	6.01
Oct. 31	Nineteenth street, from Seventh avenue to gate between Sixth and Seventh avenues	228	129.8	3.60	2.22
Nov. 8	Sixteenth street, from Seventh avenue to middle of block, Sixth to Seventh avenue	435	222.0	6.17	3.11
Nov. 21	Fifth avenue, from Ninth to Tenth street	200	112.0	3.11	2.89
Dec. 19	Twenty-first street, from Sixth avenue to Seventh avenue	891	427.2	11.86	12.29
Dec. 21	Twenty-first street, from Fifth avenue to Sixth avenue	942	427.3	11.87	7.08
Dec. 29	Nineteenth street, from Fifth avenue to Sixth avenue	895	421.0	11.70	8.94
Dec. 30	Nineteenth street, from gate between Fifth and Sixth avenues to gate between Sixth and Seventh avenues	1,108	538.3	14.95	9.71
Dec. 30	Sixteenth street, from Sixth avenue to middle of block, Fifth to Sixth avenue	361	180.1	5.00	4.06

Pipe Line, 20 Inches Diameter; Tested for Pressure of 450 Pounds Per Square Inch; Duration, Ten Minutes.

Date.	Section Tested.	Linear Feet of Pipe Line.	Linear Feet of Joints.	Allowable Leakage in Gallons.	Actual Leakage in Gallons.
Aug. 24	Twenty-third street, from Tenth avenue to gate between Tenth and Eleventh avenues	276	165.3	4.59	2.93
Nov. 2	Seventh avenue, from Eighteenth street to Twentieth street	477	272.3	7.56	5.96

Date.	Section Tested.	Linear Feet of Pipe Line.	Linear Feet of Joints.	Allowable Leakage in Gallons.	Actual Leakage in Gallons.
Nov. 8	Seventh avenue, from Sixteenth street Seventeenth street.....	229	169.6	4.71	2.98
Nov. 9	Seventh avenue, from Fifteenth street to Sixteenth street.....	258	182.2	5.05	4.83
Nov. 12	Seventh avenue, from Thirteenth street to Fifteenth street.....	531	364.4	10.12	1.86
Nov. 27	Twenty-third street, from Eighth avenue to Ninth avenue.....	773	455.2	12.63	4.83
Dec. 14	Seventh avenue, from Twentieth street to Twenty-first street.....	323	285.6	7.93	1.68

Pipe Line, 24 Inches Diameter; Tested for Pressure of 450 Pounds Per Square Inch; Duration, Ten Minutes.

Date.	Section Tested.	Linear Feet of Pipe Line.	Linear Feet of Joints.	Allowable Leakage in Gallons.	Actual Leakage in Gallons.
Oct. 15	Thirteenth street and Fifth avenue, from Fourteenth street to Thirteenth street, along Fifth avenue and to middle of block, Thirteenth street, between Fifth avenue and Sixth avenue.....	581	541.4	15.04	10.79
Oct. 22	Fifth avenue, from Fifteenth street to Sixteenth street.....	270	258.7	7.19	3.73

HIGH-PRESSURE PUMPING STATIONS.

Machinery.

The electrical equipment of these stations is being built by the Bullock Works of the Allis-Chalmers Company, at Cincinnati, Ohio, and satisfactory progress has been made. One of these motors has been tested by an electrical expert appointed by this Department for the purpose, and found to easily fulfill the requirements of the specifications. As the other nine motors are duplicates of the one tested, it is presumed that the others will also fulfill the specifications. The final test will be made after the equipment is erected in the stations, when each motor and pump will be tested singly and in groups. The pumps are being constructed at the Dixon Works of the Allis-Chalmers Company, in Scranton, Pa., and satisfactory progress is being made on this equipment. It is anticipated that shipments of all materials will commence during the early part of 1907.

Piling.

All piling for the motor and pump foundations has been driven.

Buildings.

The contracts for the pumping station buildings were awarded on September 11, 1906, to T. Cockerill & Son, for the following sums:

Gansevoort and West Streets Station	$69,527 00
Oliver and South Streets Station	71,334 00

The contract for plumbing and gas fitting was awarded on September 17, 1906, to Frank J. Fee, for the following sums:

Gansevoort and West Streets Station	$1,885 00
Oliver and South Streets Station	1,885 00

The contractor for the buildings was notified to begin work on October 1, 1906. Work was started on the Gansevoort and West Streets Station on October 1, 1906, and on the Oliver and South Streets Station on October 23, 1906. Fast progress was made on the excavation for both stations, notwithstanding the fact that a great deal of old timber crib work was encountered at the Oliver and South streets site. At Gansevoort and West streets about half of the concrete footing course has been constructed. At Oliver and South streets all of the footing course has been finished and the walls carried up about four feet.

Work on both of these buildings has been delayed on account of the extreme cold weather, during which no concrete work was allowed to be done. The contractor is prepared to resume work as soon as the weather permits and very rapid progress is anticipated.

Suction Mains.

The contract for the suction intakes for Gansevoort and West Streets Station and for the Oliver and South Streets Station was awarded on August 21, 1906, to the Continental Asphalt Paving Company, for the sum of $63,798.

The contractor was notified to begin work on September 10, 1906, and construction was started on October 9, 1906. Very fast progress was made on the suction chamber adjacent to the Gansevoort and West streets Pumping Station.

Owing to the depth at which the suction mains are laid from this suction chamber to the North River, great difficulty has been encountered from the large amount of tide water which has flooded the excavation. Delay has also been caused by the condition of the weather. The contractor for this work has arranged to materially increase his plant and very rapid progress is promised as soon as the weather opens up in the spring, and it is anticipated that this contract will be finished in ample time.

The contractors for furnishing and laying the high-pressure fire mains have made good progress with the work, especially taking into consideration the many novel and difficult features of the same.

Arrangements have been made by them to employ a much larger force next year, so as to secure still more rapid progress and be able to complete the work within their contract time. For that purpose they are accumulating sufficient material, an idea of which can be gathered by the accompanying photograph (Plate No. 4), showing the amount of pipes already stored at their pipe yard at the foot of Twenty-first street and the Hudson River.

The work of furnishing and laying the high-pressure fire mains has sufficiently progressed to make it advisable to utilize these mains as a low pressure system to be connected with the Croton mains, thus increasing the number of hydrants available for fire protection, as well as the available pressure. It is proposed, therefore, early next spring, to make a connection between the Northern District of the high-pressure fire system and the 48-inch Croton water main on Fifth avenue, near Twenty-first street.

Filtration of the Croton Water Supply.

The need of filtering the Croton supply, both as a sanitary measure and to improve the appearance of the water by removing color, turbidity and the objectionable tastes and odors, has been pointed out for several years in the past by all the engineers who have dealt with this question, and also by the Health Department of our City, and their unanimous recommendations have become more urgent with the advance of sanitary science on one hand and the increasing pollution of the watershed on the other.

The present Chief Engineer of this Department, in his annual report to the Commissioner of City Works of the City of Brooklyn for the year 1896; the engineers employed by the Merchants' Association of New York, in their report on the needs of New York's water supply in 1900; Mr. John R. Freeman, in his report to the Comptroller in the same year, and in 1903 the Commission appointed by the Department of Water Supply, Gas and Electricity, known as the Burr-Hering-Freeman Commission; the Chief Engineer of the Aqueduct Commission in 1904, and the present Commissioner and President of the Department of Health in his able report published last year, have all specifically recommended filtration, urged its immediate need, and pointed out its advantages in their several reports on the subject.

The Burr-Hering-Freeman Commission in their report of 1903 (page 270) state that after a detailed examination of all available sites, they had found only two that were availbale, i. e., at Goulds Meadow, about two miles southeast of Tarrytown and at Elmsford, about three miles southeast from Tarrytown. In their report they briefly discuss these sites and the cost of the filter beds to be erected thereon; the water from which they assume to be delivered at the height of the Jerome Park reservoir.



Temporary Pipe Yard, High Pressure Fire System.

The need of filtering the Croton water supply and of proceeding with this work without delay having been thus recognized, the Burr-Hering-Freeman Commission, in their supplementary report of January 16, 1905, to the Mayor, state as follows:

"We approve of the temporary cessation of work on the easterly portion of the Jerome Park reservoir, until the question of filtering the Croton water is settled, because this reservoir will then be used to contain the purified water and require a different design than the one called for."

In the same report they also stated that a reservoir for filtered water should be covered and protected against dust and the sun's light, that such a covered reservoir should be ready on completion of the filtration work and this could be most conveniently and economically provided by a change in the design of the proposed Eastern Basin of the Jerome Park reservoir, the cessation of work on which they had recommended. Lastly, this Commission referred to their investigations of 1903 and to the available sites for filter plants near Tarrytown, which they again recommended, as well as the speedy acquisition of the land, since delay in securing the same might seriously affect the future cost.

In January, 1905, the Aqueduct Commissioners transmitted to the Corporation Counsel the above supplementary report of the Burr-Hering-Freeman Commission, recommending filtration and the suspension of work on the Eastern Division of the Jerome Park reservoir, and also a report of their own Chief Engineer to the same effect, and requested an opinion as to the powers of the Commissioners to construct a filtration plant, and on June 13, 1905, the Corporation Counsel advised the Commissioners that they had "no jurisdiction over any such project as that contemplated."

The Aqueduct Commissioners, on December 21, 1905, adopted a resolution approving the report of their Chief Engineer to suspend work on the Easterly Basin of the Jerome Park reservoir.

On February 26, 1906, the Aqueduct Commissioners, referring to the reports above quoted, addressed a communication to his Honor the Mayor, requesting to be informed as to whether the suspension of work on the Eastern Division of the Jerome Park reservoir should continue indefinitely under the resolution above recited, or whether in the absence of an immediate plan of filtration the Aqueduct Commissioners should direct that the work be resumed on the Eastern Basin and hastened to completion. The Commissioner of this Department, to whom the above communication was referred by the Mayor, strongly reported in favor of filtration recommended by this Department as necessary, and he was then directed by the Mayor to have the requisite plans for the work prepared as soon as practicable. The Aqueduct Commissioners were advised at the same time that no further work should be done by them to complete the Eastern Division of the Jerome Park reservoir, according to the original plans.

In the last part of March, ultimo, the Commissioner of the Department directed me to make the necessary arrangements for the preparation of the requisite plans

and specifications to build the filter plants, and in my communication of March 28, after calling the attention of the Commissioner to the sites suggested and discussion of the same by the Burr-Hering-Freeman Commission on page 270 of the report of 1903 already quoted, and in their supplementary report of January 16, 1905. I added:

"I believe, however, that it may be practicable to build the proposed filter beds above the Eastern Division, not yet built, of the Jerome Park reservoir, using the roof of the latter, when covered, as the bed of the filters, in which case, in addition to other advantages, a very large saving in cost (including that of the extensive tract of land otherwise required) would be effected, tedious and expensive condemnation proceedings avoided and the time required for the completion of the work materially shortened. The simplicity of this plan is advised, but before making a more positive statement I need additional data, especially as to the conduit grades, reservoir levels, etc., which I am endeavoring to gather as speedily as possible."

"In order to proceed with this work expeditiously, we need an additional force, especially of expert men trained in this class of work. I beg, therefore, to recommend that an appropriation, say of fifty thousand dollars ($50,000) be granted for the employment of this force and the other incidental expenses needed to complete the plans, form of contracts and specifications. With an adequate force, and especially if it be found practicable to construct the filter beds at the Jerome Park reservoir, as above mentioned, it is probable that we shall be able to advertise all the main items of this work by the end of the present year."

The Commissioner of this Department addressed a communication to the Board of Estimate endorsing the recommendations of the Chief Engineer, and on May 11, the Board of Estimate and Apportionment adopted the following resolution, i. e.:

"That, pursuant to the provisions of sections 169 and 178 of the Greater New York Charter, the Board of Estimate and Apportionment hereby authorizes the Comptroller to issue Corporate Stock of The City of New York, in the manner provided by section 169 of the said Charter, to the amount of twenty-five thousand dollars ($25,000) for the purpose of enabling the Commissioner of Water Supply, Gas and Electricity to employ experts to examine in detail the entire Croton watershed, the reservoirs and the distribution system, with a view to the selection of the best site for the construction of a filter plant, and to prepare plans and specifications for the proper execution of the work."

Steps were immediately taken to secure suitable offices, fixtures, materials, etc., and appoint the necessary force. Messrs. George W. Fuller and Rudolph Hering were appointed as Consulting Engineers. Mr. Fuller's unsurpassed experience and standing as an expert on filtration, and Mr. Hering's familiarity with our water supply and his work as a member of the Burr-Hering-Freeman Commission, rendered their services particularly valuable. Mr. William B. Fuller, well and favorably known as an expert in the design and practical construction of filters, was put in charge of the work,

with Mr. F. C. Dunlap and Mr. John A. Vogelson as first and second assistants. Three draughtsmen from our regular force were also detailed to this work.

An examination was undertaken at once of all previous data relating to the filtration of the Croton water, which included records and plans of the Burr-Hering-Freeman Commission in regard to the Goulds Meadow and Elmsford sites, which they had suggested, supplemented by careful examinations of those two sites and of a third site at Dunwoodie and Tibbett's Brook. The records of the Aqueduct Commission in regard to the ground at the Eastern Basin of the Jerome Park reservoir were also examined and this site thoroughly inspected and studied. Careful experiments were made in regard to the carrying capacities of both the old and new aqueducts, with a view to determining the proper elevation and capacities of the filters and solve the question of proper distribution.

Due attention was given to improved methods of washing the sand in place in the filters, instead of scraping off the dirty sand, transporting it out of the filters, washing and bringing it back again, as improvements in this direction promised large economy both in construction and maintenance, and arrangements have been made to experiment with the so-called Brooklyn method, successfully adopted on a small scale in the filter beds at Hempstead and Forest Stream, in the Borough of Brooklyn, and with the Blaisdell washing machine; the tests in both cases to be conducted at the test station to be erected for that purpose. At this station experiments would be made also to determine the most suitable grade of filter sand to be used, head required for filtration, preparatory treatment to be given to the Croton water from the standpoint not only of purity and economy, but also of appearance of the effluent, etc.

Plans and specifications were prepared and contracts for this experimental station let to Leslie McHarg & Co., on September 25, 1906, and it is now complete and ready for operation, as outlined above. The general plan and elevation of this station is given on plate No. 5.

Experiments were made at the mechanical filters at Baisleys, Long Island, in the Borough of Brooklyn, to determine the penetration of alum into the layers of a filter operated at different rates; but owing to the short time available, they were not conclusive and will be continued at the experimental station.

In these experiments we have the co-operation of Mr. D. D. Jackson, Chemist of the Department in charge of our laboratory at Mount Prospect.

In view of recent claims made by the United Water Improvement Company of Philadelphia, of improved efficiency in the production of ozone, as well as regularity of operation under the Vossmer system, which, if substantiated, would make ozone a useful adjunct of filtration, an agreement was entered into with the said United Water Improvement Company of Philadelphia for the installation of a modern ozone plant, under the Vossmer system, in which the merits, reliability and cost of ozone, as well as its advantages as an adjunct in the filtration of the Croton water, could be deter-

mined without cost to the City, the expense of the installation of the station, running and operating of the plant being entirely at the charge of the company, but the work to be done under the immediate inspection of the City's representatives.

A similar arrangement has been made with the Blaisdell Filtration Company, of Los Angeles, Cal., to test, without cost to the City, the cost, practicability and advantages of washing sand in place with their machines.

Both the above companies are nearly ready to begin work.

After collecting all the necessary data and completing the examination of the various sites, as well as calculations of cost in each case, it was unanimously decided that the eastern basin of the Jerome Park Reservoir was the "very best site for the construction of a filter plant." This point being determined active steps were taken to "prepare plans and specifications for the proper execution of the work."

Detailed designs, contract drawings and specifications were completed for the bulk of the construction work comprising that part which would not be affected by the results of the experiments to be conducted at the experimental stations, and already referred to. These drawings comprised forty-two covered filters, resting as a two-story structure on the clear water reservoirs below.

On October 3 last a full report was made by me to the Commissioner of the Department, specifically detailing the various recommendations made for several years past for the filtration of the Croton water supply and the work done to comply with the terms of the resolution of the Board of Estimate of May 11, 1906. This report, which was endorsed by the consulting engineers, Messrs. Hering and Fuller, and which, owing to its length, is not inserted here, gave a statement of the existing conditions, mode of supply through the old and new conduits, full discussion of the two sites suggested by the Burr-Hering-Freeman Commission, of another site at Dunwoodie and of the Jerome Park Reservoir site. The main advantages of the latter were shown to be: Better protection against the influx of impure water to mix with the filtered water; increased pressure in the distribution system; more efficient and economical supervision, operation and maintenance; ability to begin work of construction at once without having to wait for the condemnation of land, which would otherwise be necessary, and which could not be begun before securing the repeal of the act passed last year by the Legislature, barring the City from condemning land in Westchester and Putnam counties; and, lastly, a large saving in construction of not less than about $6,300,000, which might probably amount to $10,200,000 if the results obtained from the experimental stations established the practicability of some of the features assumed in making the lower estimate of cost.

The cost of covering the Jerome Park Reservoir and building the filter plant there, assuming the practicability of the features above referred to, and which are not to be finally determined until the data from the experimental stations are available, was estimated at seven million six hundred thousand dollars ($7,600,000), and the cost of covering the reservoir and building the filter plants, should the results from

the experimental stations fail to establish the practicability of those features, was estimated at eleven million five hundred thousand dollars ($11,500,000). In both estimates the sum of three million four hundred thousand dollars ($3,400,000) is chargeable to the covering of the reservoir, leaving for the filter plants and accessories four million two hundred thousand dollars ($4,200,000) in one case and eight million one hundred thousand dollars ($8,100,000) as a maximum in the other. The filter plant was designed with a capacity of 400,000,000 gallons per twenty-four hours.

The report concludes as follows:

"The contract for the filters, plans and specifications for which are practically ready, and which comprises work in regard to which there will be no change, can be completed and advertised and awarded in November, and work thereon finished on or before December 1, 1908. The second contract, which will be either for a settling basin or a filtered water reservoir, according to the results of the experimental stations, will be held back until these results are available and a final decision arrived at in regard to these details. We will be able to complete and advertise it and have work commenced by April 1, 1907, and completed by December 31, 1908. The contract for the sand beds, piping, houses and other appurtenances, also held back for the present for similar reasons, can be completed, advertised and work commenced December 31, 1907, and completed by December 1, 1908.

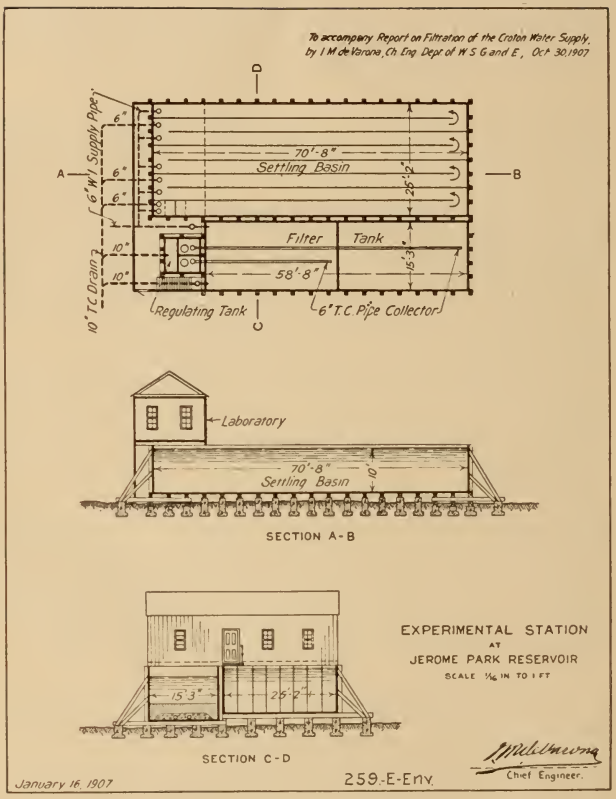
"The design and contract drawings for the first section of this work, i. e., filters, are now well advanced, and I respectfully recommend that an appropriation of $4,000,000 be asked to defray the expense of the work under this contract and incidental expenses. If this arrangement be carried out the whole plant may be completed and in operation, according to the most advanced modern standards, on or before December 31, 1908."

In the report to the Board of Estimate and Apportionment, dated November 22, 1906, transmitting the above report from the Chief Engineer of the Department, you discussed at length the need of filtration, recommended its immediate adoption, in accordance with the plans prepared by the Department, and requested the immediate appropriation of four million dollars ($4,000,000) to carry out the work comprised in the first section as detailed in the report of the Chief Engineer. Action on this resolution is now pending before the Board of Estimate and Apportionment.

Office Room.

Some improvement has been made in the distribution of the force. On the ninth floor rooms have been secured to accommodate the men employed in the high pressure fire service work and the mechanical and filtration divisions, and the rooms occupied on the sixth floor were given up.

Our force, however, is still divided, part being on the fifteenth floor and part on the ninth, as there was not sufficient room to accommodate all our offices on the latter floor. It is expected that by the beginning of next year additional quarters will be obtained on the ninth floor to accommodate the whole Engineer's Bureau.


To accompany Report on Filtration of the Croton Water Supply,
by I M de Varona, Ch Eng Dept of W S G and E, Oct 30,1907
D
6" W.I. Supply Pipe
6"
6"
6"
10"
10"
10" T.C. Drain
A
B
C
70'-8"
Settling Basin
26'-2"
Filter
Tank
15'-3"
58'-8"
Regulating Tank
6" T.C. Pipe Collector
Laboratory
70'-8"
Settling Basin
10'
SECTION A-B
15'-3"
26'-2"
SECTION C-D
EXPERIMENTAL STATION
AT
JEROME PARK RESERVOIR
SCALE 1/16 IN TO 1 FT
January 16, 1907
259-E-Eny.
Chief Engineer.

BOROUGH OF BROOKLYN.

The writer was in charge of the water supply for the Borough of Brooklyn until July 13, 1906, and the condition of the work connected with the supply at that date will be briefly reviewed.

Sources of Supply.

The Borough of Brooklyn during the last six months of 1905 passed through a shortage in the supply, the reasons for which, fully detailed in the annual report for that year, conclusively show that the responsibility for that shortage did not lie with the Engineering Bureau. It may be added that while at times there was unavoidable discomfort by the reduced pressure, the available supply was so handled that no loss of property resulted even then from inadequate pressure at any fire, as far as the records show, and efficient and rapid work was done to increase the yield of the existing watershed so that the reduction in pressure during the day and early evening hours was entirely discontinued at the beginning of this year.

The measures taken to insure an increase in the supply which would effectively meet the deficiency of 1905, were as follows:

New wells at the Gravesend station.

Temporary pumping plant at the New Lots station.

Utilization of temporary pumping plant at Spring Creek.

New driven well station on the conduit line at Aqueduct.

New shallow wells at Jameco and pumping from deep wells at Jameco by the air-lift system.

New driven well station on the conduit line at St. Albans.

New driven well station on the conduit line at Rosedale.

Additional supply from the Queens County Water Company.

Temporary pumping plant at the Hempstead storage reservoir.

Six temporary pumping plants along the line of the Massapequa gallery.

New shallow wells at the Spring Creek, Oconee, Clear Stream and Forest Stream stations and deep wells at the New Lots station.

In addition to this emergency work, the plans for increasing the supply provided for the rapid completion of the Massapequa infiltration gallery; the construction of the Canarsie pumping station; the construction of an additional pumping station within the Borough limits, located probably at Parkville; the sinking of deep wells along the line of the Massapequa and Wantagh galleries and at various stations on the old watershed between Clear Stream and Spring Creek stations; the remodeling of the New Lots station, and the remodeling of both the North and South Side Ridgewood stations and full development of the watershed by new galleries or wells.

Of the work outlined all the emergency stations were completed early in the year and the supply greatly augmented by these emergency stations, the supply obtained from these works being approximately as follows:

	Gallons.
Gravesend station	500,000
*Temporary plant at New Lots	2,000,000
Temporary plant at Spring Creek	500,000
Aqueduct station	4,000,000
Jameco shallow wells	1,750,000
*Jameco deep wells (air-lift system)	4,000,000
St. Albans	2,500,000
Rosedale	2,500,000
Queens County Water Company	2,000,000
Pumping plants along the line of the Massapequa gallery	10,000,000
New wells at Spring Creek, Oconee, Clear Stream and Forest Stream	4,000,000
Total	33,750,000

The above increase, although large, was obtained at a comparatively small expenditure. The total cost of the works connected with the increase, exclusive of the supply obtained from the Jameco wells and from the Queens County Water Company, being approximately $100,000.

It was expected that the contract for the deep wells along the lines of the Massapequa and Wantagh galleries and at Clear Stream, Forest Stream, Rosedale, St. Albans, Aqueduct and Spring Creek would be let in time to have the wells sunk before the end of the summer, but a delay in the contract, for which this Bureau was not responsible, made it certain that no addition to the supply could be obtained from these works to tide over a possible drought in the summer. This contract was so drawn that the first well sunk at each station would be tested as a test well, so that if satisfactory material was not encountered there, the City could order the wells driven at another place.

Owing to the difficulty of securing proper coal for our Ridgewood pumping station, on account of the unsettled labor conditions in the mining regions, we were, during June, unable to maintain the level of the Ridgewood Reservoir at its normal elevation, in spite of the large increase in supply already outlined.

With the prospect of a dry, hot summer and consequent increase in consumption and probable reduction in supply, it did not seem advisable to wait until a reduction became imperative through inadequate water supply, and therefore recommendation was made at the end of June to the Board of Aldermen for authorization to spend $60,000 for the necessary pumps, boilers, suction mains, wells, etc., for five additional temporary pumping plants, to be located at Woodhaven, Shetucket, Morris Park,

*This estimate based on conditions of July 1, 1906.

Lynbrook and Millburn Reservoir, and under authority from the Deputy Commissioner for Brooklyn, orders were issued for the necessary pumps and boilers to actively commence work on the construction of these stations, and this work was in progress when the writer's direction of the work of the Engineering Bureau in Brooklyn terminated.

The unusual and wet weather of July made the immediate establishment of these stations unnecessary, but had the meteorlogical conditions been different, as was to be reasonably expected from previous records, the delay in the establishment of these stations would have cost, by the consequent reduction in pressure and inconvenience to the citizens, a loss which it is difficult to estimate in dollars and cents, but which undoubtedly would have meant to the property owners and citizens of Brooklyn many times the amount which it was proposed to expend for the new stations. The construction of these new stations has been continued, and the development of the supply by additional wells, other than those already planned and outlined by the writer, has not been carried on, so that the claim advanced in some quarters that it would be more expeditious and economical to increase the supply by sinking additional wells at the existing pumping stations, is not supported by the facts.

The writer has always been in favor of developing to the utmost the supply from existing stations, but the amount obtainable therefrom is necessarily limited on account of the chlorine in the water when it reaches a point at which the quality of the supply would be affected and damage caused to many manufacturing plants in the Borough where public water is used for the boiler supply. It is easy to draw immense quantities of water from the Long Island sands on the south side near tidewater if we could disregard the infiltration of salt water; but the use of water high in chlorine has, among other disadvantages, been proven to be highly detrimental to the life of boilers, pipes, tanks, etc., and at our Ridgewood station, where water high in chlorine was used for a limited time, the boiler tubes and shells were badly pitted in a very short period.

The need of extending the system into Suffolk County and the inadequacy of the present watershed, even when fully developed, to safely supply the Borough beyond the year 1909, has been shown in my previous reports, and an effort was therefore made in the early part of the year to test the constitutionality of the Burr Law by driving wells in Suffolk County just east of the County line and discharging the water into the Brooklyn aqueduct through a flume and pipes extending from the County line to Massapequa.

The establishment of this station did not result, as it was hoped it would, in action being brought by the Suffolk County authorities to restrain the City, and the plant was therefore only operated for a short time.

Conduit Cacapity.

The inadequacy of the existing conduit lines has been reported in several of the past annual and quarterly reports, and a contract for the first section, i. e., from

Ridgewood to Clear Stream, of a 72-inch steel pipe line, to be laid from the Ridgewood station to the Wantagh or Massapequa station, was prepared, the maps of the necessary lands forwarded and the contract ready for advertising early in the spring. Bids were received as soon as the Corporation Counsel decided that they would be legal and the contractors had actively commenced work prior to the writer's relinquishing the Brooklyn work. It was expected to connect the new stations at Woodhaven, Shetucket and Morris Park and also some of the existing stations to this pipe line and utilize it in this way prior to its extension eastward.

Pumping Stations.

Plans and specifications had been made for the remodeling of the Ridgewood North Side station, including four new pumping engines, new boiler plant and machine shop, and the contracts had already been awarded and the preliminary work well advanced of remodeling the South Side pumping station, including new water tube boilers, new chimneys and a 20,000,000 centrifugal pump, to be utilized during the time that the North Side station was being remodeled.

The contract for remodeling the Morris boilers on the North Side was nearly completed and a contract had been made for a temporary boiler plant on the South Side, to be used while the old boilers were being removed and the water tube boilers installed. The boiler plants were therefore in much better condition than had been the case prior to the completion of this work, and no difficulty should be experienced at this station in obtaining the necessary steam during the time of remodeling.

Studies were far advanced in determining the most economical method to be utilized in developing the shallow and deep underground supply on the south side of Long Island to its utmost, and for obvious economical reasons prior to the commencement of the work of installing the necessary stations, wells, etc., to carry out this plan the only work done on the existing stations was that which was essential to keep them in safe condition, so that while many of these stations did not present a favorable appearance to the eye, they were, nevertheless, in good repair and capable of safely pumping the supply available.

Owing to the lack of the necessary clerical help, the daily records kept at all the pumping stations showing the cost of pumping in all its details, although kept, had not been compiled, and this lack of help had frequently been referred to and attempts made to obtain the requisite force, as the work of keeping careful, detailed cost records at the pumping stations was one that was initiated under the writer's personal direction about thirteen years ago.

A careful study was made several years ago of the methods of keeping an accurate record of the coal delivered at the various pumping stations and paying the contractor on the basis of the coal so delivered. It was found, however, that the cost of this system would be several times greater than the value of the amount of coal that could possibly be lost under the system of purchasing the coal from coal dealers and having it

hauled by a separate contractor. This work of hauling and storing the coal was done under careful supervision, and little, if any, coal has been lost since the system has been in vogue, while the cost to the City for the coal has been much less than it would have been had the contractor been compelled to furnish, haul, store and trim the coal and be paid on the basis of the weights certified at the station, as our experience has proven that the large dealers would not bid under these conditions and there would be practically no competition.

Distribution System.

The work of remodeling and extending the distribution system was carried on under several contracts, one of which provided for the removing and relaying of mains on Wythe and other avenues, and another for laying trunk mains through Fort Hamilton avenue, Gravesend avenue, etc., where the increased pressure due to these mains would remedy existing conditions of inadequate pressure. About one-half of the 20 and 30 inch mains on which there had been no hydrants set when the mains were originally laid have had hydrants set, and an additional contract for the remainder of the mains was ready as soon as the money was available.

Past reports have frequently spoken of the necessity of cross-connecting existing mains and laying trunk mains throughout the Borough, and a comprehensive plan of trunk mains was laid out both for the old and new sections of the Borough, and the report of the Committee of Twenty of the National Board of Fire Underwriters, recently made, covering the Boroughs of Brooklyn and Queens, does not recommend any additional water mains other than those proposed by the writer in the Borough of Brooklyn, and I have been informed that this is the only case where additional mains have not been so recommended. The partial carrying out of plans outlined in 1902 and 1903, when the extension of the distribution system first came under the control of the writer, has resulted in a material reduction in the fire insurance rates in sections covering large areas of the important business centres of the Borough, and the completion of these plans would still further materially reduce the fire insurance rates, the plans having, as already stated, received the unqualified approval of the Board of Fire Underwriters.

The care and maintenance of the distribution system did not form a part of the Engineer's Bureau until May, 1905, and since that date many important improvements have been made in the hydrants and valves, and many others recomended, which were not carried out owing to the inadequate force available.

High-Pressure Fire Service Stations.

The Coney Island system has shown by its successful operation that it was adequately designed to meet the needs of the service and its completion has resulted in a material reduction in fire insurance rates.

The main system has been well advanced and the work of installing the mains, hydrants and gates should be completed during the year. The contracts for the pumping stations have been prepared and bids received, and, while there have been vexatious

delays on this work, due to causes entirely outside of the control of this Bureau, the work should now progress without delay.

Brief Summary of Development of Broooklyn Supply Since 1894.

It would seem pertinent to record here the development in the supply of water for the Borough of Brooklyn since this work was placed under a separate Bureau, in 1894, and the writer assigned to take charge of the same, under the Chief Engineer. At that time the distribution system was not included under the Engineer's Bureau, and it was not until 1902 that the extension to the distribution system came under the writer's supervision, while the maintenance and repairs to the distribution system did not form part of his work until 1905.

The average daily supply in 1894 amounted to 71,000,000 gallons, while at the present time it amounts to about 127,000,000 gallons, or an increase in the supply of 56,000,000 gallons, or practically 80 per cent. of the entire supply in 1894. This increase in supply has been obtained by developing the existing watershed and utilizing more fully both the shallow and deep water strata underlying the south shore of Long Island.

The so-called deep strata are mainly found at depths of about 125 to 200 feet below the ground level, although there are deeper strata at various levels below this point. These deep wells were first developed in connection with the Brooklyn supply by Andrews Bros., about a quarter of a century ago, flowing wells then being obtained at the Jameco and Forest Stream plants.

The cost of obtaining this supply has been much greater than the cost of developing the supply nearer the surface, the upper water strata being usually obtained either at the surface or at a depth of 15 to 20 feet below the surface.

The proper and economical development of the Long Island supply is to first exhaust the supply which lies near the surface and then develop the lower levels, the water from which is obtained with greater difficulty and at much greater expense, and, furthermore, as the source of supply for both the upper and lower strata is undoubtedly from the central part of Long Island, and from the same gathering ground, an excessive development of the lower strata would rob the upper strata and result in the City paying an unnecessary amount for the water obtained.

There have been several cases, however, where the deep well strata was more advantageously located than the shallow well strata along the line of our conduit, and deep wells had therefore been driven from time to time at the following stations:

New Lots,	Springfield,
Spring Creek,	Merrick,
Shetucket,	Matowa,
Oconee,	Wantagh,
Jameco,	Massapequa.

The amount obtained from these stations was approximately 16,000,000 gallons daily, while the amount obtained from the development of the upper strata has reached

at least four times this amount. Furthermore, the development of the upper strata has resulted in naturally filtering the surface water, which is essentially a spring water which has found its way into the small streams, and by developing the upper strata this water, in many cases, was prevented from entering the streams, and in other cases sinks back into the sand and is drawn from the collecting works as a pure, cold, clear supply perfectly free from any danger of contamination. In 1894 the amount of water obtained from well sources amounted to 22,000,000 gallons daily, while in 1906 the amount obtained of the well and filtered water amounted, at times, to about 80 per cent. of the entire supply or 100,000,000 gallons daily.

The number of pumping stations connected with the City supply in 1894 were as follows:

Mt. Prospect,
Ridgewood,
Spring Creek,
Baiseleys,
Jameco,
Springfield,
Forest Stream,
Clear Stream,
Watts Pond,
Smiths Pond,
Millburn.

In 1906 the stations connected with the City supply were as follows:

New Utrecht,
Gravesend,
Mt. Prospect,
Ridgewood,
New Lots,
Spring Creek,
Aqueduct,
Oconee,
Baiseleys,
Jameco,
St. Albans,
Springfield,
Rosedale,
Forest Stream,
Clear Stream,
Watts Pond,
Smiths Pond,
Millburn,
Agawam.
Merrick,
Matowa,
Wantagh infiltration gallery,
Wantagh deep wells,
Massepequa infiltration gallery,
Massepequa deep wells,
Amityville,

and, in addition, plans had been prepared for the Canarsie, Woodhaven, Shetucket, Morris Park, Lynbrook and Rockville Centre stations.

The work done in connection with the increase in the supply, besides covering the construction of these new stations, embraced the remodeling and extension of many of the stations, the laying of the new 48-inch conduit line from Millburn to Ridgewood, and the contracting for the first section of the new 72-inch steel pipe line from Ridgewood to Massapequa.

The remodeling and extension of the distribution system has been carried on in a much shorter period, this work being put under the writer's direction in 1902, and in the latter part of the same year large increases in the fire insurance rates, due to inadequate water supply and pressure, were imposed by the Fire Insurance Exchange over the more important manufacturing and business sections of the Borough. The work of remodeling the system was prosecuted with such energy that these rates have been reduced in the more important sections, resulting, in some cases, in an annual saving to the insured of an amount more than equal to the total cost of the new mains installed. Since December 31, 1901, the following work has been done:

Linear Feet

Year.	48-inch.	36-inch.	30-inch.
1902			
1903	13,905	2,100	102
1904	27,818	1,310	12,119
1905			1,080
Total	41,723	3,410	13,301
Total laid prior to 1902	139,480	60,184	62,759

of Pipe Laid.

24-inch.	20-inch.	16-inch.	12-inch.	8-inch.	6-inch.	Hydrants Set.
.....	1,320		5,295	14,353	32,280	143
.....	486		21,685	60,169	40,313	333
20,769	81,792	16,421	19,330	62,518	55,041	930
1,160	35,457	7,758	43,549	88,610	34,800	1,149
21,929	119,055	24,179	89,859	225,660	162,434	2,555
.....	255,691	80,820	330,758	698,376	1,890,514	9,272

It will be seen by this table that in a short space of four years the linear feet of 48-inch main laid had increased about 30 per cent., of the 36-inch about 5 per cent., the 30-inch about 20 per cent., the 24-inch about 100 per cent., the 20-inch about 46 per cent., the 16-inch about 30 per cent., and the 12-inch about 27 per cent., while of the 6-inch mains many miles of the old tuberculated mains of this size had been removed. The total amount expenses in remodeling and extending the distribution system has, during the four years referred to, equalled approximately 40 per cent. of the total cost of the distribution system for the 44 years preceding (since the works were established).

Utilizing the unused space in the old gate house of the Mt. Prospect reservoir, a laboratory has been installed for the thorough and systematic analyses of our water, in accordance with the most approved modern methods, which, both in point of equipment and as regards the character of the work, is the best established one for that purpose in this country, according to the testimony of the many experts who have visited it. The equipment of the laboratory has been increased and its work now extends to the analyses and tests of oils, coal, metal, paint, cement, etc., for all the Boroughs, making therefore a valuable adjunct in the management of the work of this Department.

In addition to this work on the distribution system, the high pressure fire service system at Coney Island had been installed and the main system was well advanced, all the essential contracts either being let or being ready for advertising.

The above brief outline cannot obviously include and show the numerous improvements made in the detail work of maintenance and operation, but gives some idea, although necessarily restricted, of the extraordinary development of the Brooklyn supply, accomplished often under exceptional difficulties in addition to those inseparable to the construction and management of public systems of water works. The increased efficiency and extension of all parts of the system is the most satisfactory tribute to the efficiency and zeal of the Engineering Bureau during this period.

Respectfully submitted,

I. M. DE VARONA, Chief Engineer.

II.

OFFICE OF DEPUTY COMMISSIONER.

Department of Water Supply, Gas and Electricity,
Office of Deputy Commissioner,
Municipal Building, Room 28,
Brooklyn, April 1, 1907.

Hon. JOHN H. O'BRIEN, Commissioner of Water Supply, Gas and Electricity:

Dear Sir—I beg to transmit herewith the annual reports presented to me by the heads of the following Bureaus, showing the transactions of the Department in this Borough during the year ending December 31, 1906:

Bureau of Chief Engineer—J. W. McKay, Acting Chief Engineer.

Bureau of Water Rates—William R. McGuire, Water Registrar.

Bureau of Electricity and Gas—H. S. Wynkoop, Electrical Engineer.

Office of Supplies and Accounts—J. J. Flannery, Bookkeeper.

The average daily consumption of water from the Brooklyn system during the year 1906 was 127,068,614 gallons, an average consumption per capita of 93.6 gallons per day. The maximum daily consumption, occurring on September 10, was 143,097,000 gallons.

At the commencement of the year the supply was barely sufficient to meet the needs of the Borough; but with the new work then under way, the improvements of existing well plants, the starting up of one new station, the careful management of the supply and distribution systems, aided by a fairly good rainfall, we were enabled to get and maintain the height of water in the distribution reservoirs normal and higher than it has been for some years past.

The increase in supply from underground sources was approximately 38,000,000 gallons per day. This does not, however, represent a net increase, as the yield of the surface streams and ponds has been diminished by the development of the underground supply and reduced from about 19,000,000 gallons per day to about 8,000,000 gallons per day.

The diversion of the water from the surface to the underlying sands and gravels results in a natural filtration which is not only absolutely safe, but will provide the Borough with clear, cold water of the very highest quality.

Much work has been done in the extension of new mains and the substitution of larger mains for small and old ones throughout various sections of the Borough. This work has borne fruit in a reduction of twenty per cent. in the fire insurance rate in what was known as District No. 1 and in the Kent avenue district.

The high pressure fire service system at Coney Island has given satisfactory service during the year. The contracts have been awarded and work is progressing on the two high pressure fire stations at Furman and Joralemon streets and at Willoughby and St. Edwards streets.

Contracts have been awarded for the construction and equipment of a new pumping station within the Borough limits, to be located at Avenue D and Remsen avenue and known as the Canarsie Pumping Station.

Much work has been done on the new 72-inch steel pipe line, about 24,000 feet having been laid and all of the connecting 48-inch pipe, since the contractors began work, on June 19.

In order to test, if possible, the Burr act, a pumping station was installed at the beginning of the year on the section of land lying within the boundaries of Suffolk County, at the easterly end of the strip purchased by the City for the Massapequa Gallery.

This station was opened on March 14 and operated until May 29, when it was shut down; it was operated again, however, from September 19 to October 27, when it

was finally shut down and dismantled, no action having been taken by the Suffolk County authorities in the matter.

Bureau of Water Rates.

The collections for water rents of the year 1906—with the addition of water charges for previous years, collected by the Department of Arrears—amounted to $3,190,227.35, an increase over 1905 of $252,677.48.

The total number of water meters in use in the Borough on December 31, 1906, was 8,896, an increase of 1,724 over the number in service at the close of the year 1905.

In February, 1905, twenty-two Inspectors from this Borough were detailed for duty in the Borough of Manhattan, and fifteen of them are still working there. The salaries of these Inspectors, amounting to $15,427, have been paid from the appropriation for the Borough of Brooklyn. The loss of their services has seriously handicapped the Bureau of Water Rates, as it has been impossible, with the force of Inspectors available, to properly inspect the Borough for new buildings and alterations.

Bureau of Electricity and Gas.

This Bureau is charged with the duty of inspecting all electrical appliances or wiring introduced into buildings in this Borough; with the reinspection of old electric equipments and the investigation of all fires which appear to have been caused by electricity. The electrical features used on the stages of our various theatres receive special inspection every week.

During the year 1906 the total number of applications for permits and certificates was 29,898, an increase of 44 per cent. over 1905. The percentage of increase in subway permits is largely in excess of that for pole and overhead permits, viz.: 83 per cent., as against 47 per cent.

It has been found impracticable to secure results of any importance in the removal of poles and wires from the streets, owing to the fact that fire and police telegraph lines are constructed and maintained by their respective departments.

The total number of electrical inspections made during the year was 37,057; total number of complaints, 1,885, 9 per cent. less than last year.

Bureau of Lamps and Lighting.

So far as the Lighting Bureau is concerned, considerable progress was made during the year 1906 in the matter of street lighting, and the plans which have been prepared under the direction of Mr. C. F. Lacombe, Chief Engineer of Light and Power, for the year 1907 contemplate many important improvements. During the past year 5,700 open flame gas lamps were discarded and Welsbach burners substituted. These new lights are scattered all over the older portions of the Borough, and to-day all of the principal streets are well lighted. We have also lighted Kings Highway from end to end with arc lamps. Negotiations are pending with the Kings County

Lighting Company, which will enable the department to discard nearly 6,000 old-fashioned open flame lamps in the Bay Ridge, Borough Park, Bensonhurst and Bath Beach sections and substitute mantle lamps. In addition to this, it is the intention of the Department to issue a great many lighting orders for that section and to greatly improve the lighting on Bushwick avenue and Broadway. So far as the appropriations for street lighting will permit, we shall make an effort to keep pace with the growth of the borough in the matter of street lighting.

The detailed report of this Bureau for the Borough of Brooklyn will be submitted to you in connection with the report of Mr. Lacombe for the City as a whole, covering the five Boroughs.

Yours truly,

WM. C. COZIER,

Deputy Commissioner, Borough of Brooklyn.

REPORT OF CHIEF ENGINEER.

Department of Water Supply, Gas and Electricity,
Chief Engineer's Office—Room 25, Municipal Building,
Brooklyn, January 15, 1907.

Hon. WILLIAM C. COZIER, Deputy Commissioner of Water Supply, Gas and Electricity:

Dear Sir—The following report shows the condition of the water supply in the Borough of Brooklyn, and the work done in connection with the same for the year ending December 31, 1906; and also the receipts (classifying only those for metered and unmetered water), and the expenditures provided for under the Water Revenue Budget prepared by this Bureau, as well as those items of the Tax Levy Budget chargeable to engineering work:

Receipts.	1905.	1906.
Regular water rates	$1,698,479 26	$1,829,088 76
Metered water rates	905,086 63	982,650 04
Default, arrears, etc	338,101 23	378,167 23
Total receipts	$2,941,667 12	$3,189,906 03
Revenue refunds	2,408 70	2,026 66
Net receipts	$2,939,258 42	$3,187,879 37

	1905.		1906.	
Expenditures, Water Revenue Budget.				
Maintenance of Supply—				
Chief Engineer:				
Salaries	$502,350 33		$620,549 33	
Supplies	292,619 78		402,379 03	
		$794,970 11		$1,022,928 36
Maintenance of Distribution—				
Distribution and Repairs:				
Salaries	$246,363 89		$271,629 82	
Supplies	31,446 31		40,420 97	
		277,810 20		312,050 79
Deputy Commissioner—				
Supplies		762 65		1,017 67
Supplies and Accounts—				
Salaries	$11,740 71		$12,852 50	
Supplies	114 99			
		11,855 70		12,852 50
Water Registrar—				
Salaries (Inspectors)	$31,066 64		$31,037 26	
Supplies	960 48		585 83	
		32,027 12		31,623 09
Total expenditures, Water Revenue		$1,117,425 78		$1,380,472 41
Expenditures, Tax Levy Budget.				
Salaries—				
Laboratory	$7,237 58		$9,576 16	
High-pressure fire stations			8,645 90	
Rentals of fire hydrants	18,750 00		19,200 00	
Supplies and Contingencies	1,213 81			
Total expenditures, Tax Levy		27,201 39		37,422 06
Total expenditures, Water Revenue and Tax Levy		$1,144,627 17		$1,417,894 47

Appropriations, Expenditures and Balances.

APPROPRIATIONS FOR 1905.

Rentals of Fire Hydrants.

Balance, January 1, 1906	$6,250 00	
Expended per voucher	6,250 00	
		

APPROPRIATIONS FOR 1906.

Salaries, Laboratory.

Appropriation	$9,800 00	
Expended per voucher	9,576 16	
Cash balance, January 1, 1907		$223 84

Salaries, High-Pressure Fire Service.

Appropriation	$14,323 75	
Transfer by Board of Estimate and Apportionment, December 7, 1906	5,300 00	
	$9,023 75	
Expended per voucher	8,645 90	
Cash balance, January 1, 1907		$377 85

Rentals of Fire Hydrants.

Appropriation	$27,400 00	
Expended per voucher	19,200 00	
Cash balance, January 1, 1907	$8,200 00	
Contract liability	7,007 50	
Estimated balance, January 1, 1907		$1,192 50

BOND ACCOUNTS.

High-Pressure Fire Service, Etc.

Balance, January 1, 1906	$1,129,280 38	
Premiums on Bonds not previously credited	27,051 00	
	$1,156,331 38	
Expended per voucher:		
Salaries	$34,428 99	
Contracts	484,157 70	
Sundries	89,291 06	
	607,877 75	
Cash balance, January 1, 1907	$548,453 63	

Estimated Liabilities—			
Contracts	$481,535 68		
Sundries	323 65		
		481,859 33	
Estimated balance, January 1, 1907			$66,594 30

Water Construction.

Balance, January 1, 1906		$651,477 65	
Expended per voucher			
Balance, January 1, 1907			$651,477 65

Water Main Fund.

Balance, January 1, 1906		$31,387 23	
Expended per voucher:			
Contract		3,797 51	
Cash balance, January 1, 1907			$27,589 72

Water Fund.

Balance, January 1, 1906		$1,253,940 02	
Resolution of Board of Estimate and Apportionment, June 23, 1905, authorizing issue of Corporate Stock; adopted by Board of Aldermen, March 13, 1906; approved by the Mayor, March 20, 1906		3,390,000 00	
Premium on sales of Bonds not previously credited		47,637 54	
		$4,691,577 56	
Expended per voucher:			
Salaries	$121,634 89		
Contracts	1,251,513 10		
Sundries	266,993 61		
		1,640,141 60	
Cash balance, January 1, 1907		$3,051,435 96	
Estimated Liabilities—			
Contracts	$1,800,520 22		
Sundries	15,674 08		
		1,816,194 30	
Estimated balance, January 1, 1907			$1,235,241 66

WATER REVENUE ACCOUNTS.

Maintenance and Distribution of Water Supply, 1906.

Appropriation by Board of Estimate and Apportionment:			
January 19, 1906		$500,000 00	
June 22, 1906		1,244,764 59	
		$1,744,764 59	
Expended per voucher:			
Salaries	$936,068 91		
Contracts	291,823 81		
Sundries	152,579 69		
		1,380,472 41	
Cash balance, January 1, 1907		$364,292 18	
Estimated Liabilities—			
Contracts	$304,668 87		
Sundries	70,892 88		
		$375,561 75	
Estimated deficit, January 1, 1907			$11,269 57

Maintenance and Distribution of Water Supply, 1905.

Balance, January 1, 1906		$407,796 15	
Transfer to Water Revenue by Board of Estimate and Apportionment, December 21, 1906		55,000 00	
		$352,796 15	
Expended per voucher:			
Salaries	$4,708 53		
Contracts	263,967 19		
Sundries	63,213 24		
		331,888 96	
Cash balance, January 1, 1907		$20,907 19	
Estimated Liabilities—			
Contracts	$6,528 23		
Sundries	3,084 50		
		9,612 73	
Estimated balance, January 1, 1907			$11,294 46

Maintenance and Distribution of Water Supply, 1904.

Balance, January 1, 1906		$20,952 84	
Appropriation by resolution, Board of Estimate and Apportionment, September 14, 1906		3,563 98	
		$24,516 82	
Expended per voucher:			
Contracts	$5,415 86		
Sundries	3,923 49		
		9,339 35	
Cash balance, January 1, 1907		$15,177 47	
Estimated Liabilities—			
Contracts	$66 56		
Sundries	2,866 00		
		2,932 56	
Estimated balance, January 1, 1907			$12,244 91

Maintenance and Distribution of Water Supply, 1903.

Balance, January 1, 1906		$5,240 30	
Transfer to Water Revenue by resolution, Board of Estimate and Apportionment, December 21, 1906		2,000 00	
		$3,240 30	
Expended per voucher:			
Sundries		374 40	
Cash balance, January 1, 1907		$2,865 90	
Estimated Liabilities—			
Sundries		1,000 00	
Estimated balance, January 1, 1907			$1,865 90

Maintenance and Distribution of Water Supply, 1902.

Balance, January 1, 1906	$50,042 87	
Transfer to Water Revenue by resolution, Board of Estimate and Apportionment, December 21, 1906	48,000 00	
	$2,042 87	
Expended per voucher:		
Sundries	9 66	
Cash balance, January 1, 1907	$2,033 21	
Estimated Liabilities—		
Sundries	1,000 00	
Estimated balance, January 1, 1907		$1,033 21

SUM

BOROUGH OF

Appropriation Accounts.	
Salaries—	
Laboratory, 1906	
High Pressure Fire Service Stations, 1906	
Rentals of Fire Hydrants—	
1906	
1905	
Total Disbursements, Appropriations	
Bond Accounts.	
High Pressure Fire Service, etc	
Water Fund	
Water Construction	
Water Main Fund	
Total Disbursements, Bond Accounts	
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Maintenance and Distribution of Water Supply—	
1906	
1905	
1904	
1903	
1902	
Total Disbursements, Water Revenue Accounts	
Total Expenses During Year 1906	

MARY.

BROOKLYN.

Amount Available During 1906.	Disbursements Per Voucher.		Cash Balance, Jan. 1, 1907.	Estimated Liabilities.	Estimated Balance, Jan. 1, 1907.
$9,800 00	$9,576 16		$223 84		$223 84
9,023 75	8,645 90		377 85		377 85
27,400 00	19,200 00		8,200 00	$7,007 50	1,192 50
6,250 00	6,250 00				
		$43,672 06			
1,156,331 38	$607,877 75		548,453 63	481,859 33	66,594 30
4,691,577 56	1,640,141 60		3,051,435 96	1,816,194 30	1,235,241 66
651,477 65			651,477 65		651,477 65
31,387 23	3,797 51		27,589 72		27,589 72
		2,251,816 86			
1,744,764 59	$1,380,472 41		364,292 18	375,561 75	11,269 57
352,795 15	331,888 96		20,907 19	9,612 73	11,294 46
24,516 82	9,339 35		15,177 47	2,932 56	12,244 91
3,240 30	374 40		2,865 90	1,000 00	1,865 90
2,042 87	9 66		2,033 21	1,000 00	1,033 21
		1,722,084 78			
		$4,017,573 70			

Water Consumption. U. S. Gallons—All Supplies.

	1905.	1906.
Average daily consumption	119,234,968	127,068,614
Maximum daily consumption, winter months	138,144,292 (Feb. 14)	137,322,000 (Dec. 7)
Maximum daily consumption, summer months	131,933,916 (July 14)	142,445,000 (June 29)
Maximum average daily consumption for one month	129,515,942 (February)	134,311,233 (June)
Maximum daily consumption for year	138,144,292 (Feb. 14)	143,097,000 (Sept. 10)
Population dependent upon the systems	1,312,900	1,358,000
Average consumption per head per day	90.8	93.6

In the above table, and in the statements hereinafter to be made on the condition of the supply, the item of "consumption" includes not only the actual amount of water used by consumers, but also waste and any errors of measurement.

Storage.

Reservoir.	January 1, 1906.		January 1, 1907.	
	Depth in Feet.	Contents, United States Gallons.	Depth in Feet.	Contents, United States Gallons.
Ridgewood Basin No. 1	17.20	60,170,000	16.84	58,820,000
Ridgewood Basin No. 2	17.15	69,747,000	16.42	66,569,000
Ridgewood Basin No. 3	17.05	126,121,000	15.61	114,907,000
Mount Prospect	18.88	17,945,000	19.52	18,651,000
New Lots	12.70	3,259,000	*	*
Total (City)		277,242,000		258,947,000
Hempstead	3.92	40,215,000	10.71	284,471,000
Total storage		317,457,000		543,418,000

* New Lots Reservoir was emptied and abandoned on February 4.

Rainfall, in Inches.

Year.	Brooklyn.	Hempstead.
1900	43.11	41.43
1901	47.98	49.92
1902	48.47	51.98
1903	52.49	52.14
1904	44.41	48.62
1905	42.42	36.82
1906	44.79	44.12

While the total rainfall recorded at Brooklyn and at Hempstead was practically the same for the year, there was quite a wide variation in the monthly distribution, the rainfall in general during the spring months being greater in the Borough, while for June and July it was much greater on the watershed, the rainfall for these two months on the watershed amounting to 9.86 inches, and within the Borough limits amounting to 5.84 inches. The large rainfall on the watershed during these months was of great aid in maintaining the necessary supply, and the proportion of rainfall lost by evaporation was much less than would have been the case had light rainfalls been experienced. During August and September the rainfall was light, and the effect of this light rainfall was shown in the reduction in the amount of water stored in the distribution reservoirs and the Hempstead reservoir. This amount was a maximum on August 6, 1906, and decreased on account of the light rainfall, the reduction continuing during September and up to October 20, when the heavy rainfalls greatly increased the supply.

For several years past any estimate made of rainfall based on the experience of former years would have indicated a rainfall below the average, but the actual rainfall has been above the average, with the exception of the years 1900 and 1905, the rainfall in 1900 being only slightly below the average, while in 1905 it was considerably below the average at Hempstead and nearly equal to the average in Brooklyn. The abnormally long period of rainfall in excess of the average would indicate that there would be a corresponding period of drought, and it is therefore probable that within the next three to five years the supply to be obtained from the watershed will be available under drought conditions, and it is not reasonable to expect a supply equal to that which has been obtained in past years.

General Condition of the Supply.

At the commencement of the year the supply was barely sufficient to meet the needs of the Borough, but the new work then being carried out to increase the supply

had advanced sufficiently to warrant the resumption of full pressure in the distribution system throughout the day, even though the Hempstead Storage Reservoir was practically empty, and the total contents of the distribution reservoirs and the Hempstead Storage Reservoir was only 317,000,000 gallons, as compared with about 1,200,000,000 gallons with all the reservoirs full.

As the new stations were completed the amount in storage steadily increased, so that by the beginning of May the amount stored had reached over 900,000,000 gallons. During the latter part of May and the early part of June, however, the weather was dry and hot, increasing materially the consumption and reducing the available supply.

And to further add to the difficulties of maintaining the requisite amount of water in our distribution reservoirs, the coal supplied to the Department at this time was not of the kind suitable for the boilers at the Ridgewood station, and the pumping was necessarily reduced to a point below that sufficient to supply the amount of water necessary to meet the consumption. This difficulty with coal was due to the unsettled labor conditions in the coal regions, and for a while it was impracticable to obtain anthracite coal of the size used at the Ridgewood station. Therefore, while the amount of water held in the Hempstead Reservoir increased from 588,000,000 gallons on May 1 to 646,000,000 gallons on June 30, the amount held in the distributing reservoirs dropped from 314,000,000 gallons to 237,000,000.

The meteorological conditions in previous years made it probable that a dry, hot summer would be experienced, and had such been the case the supply would not have been equal to the demand, nor would the conduit capacity have been sufficient to carry the requisite amount of water to the City, under the conditions of distribution of the supply as then existing.

A request was made to the Board of Aldermen to authorize an expenditure of $70,000 for pumps, boilers, wells, etc., for new temporary driven well stations, it being intended to construct these stations and put them in operation before the end of the summer. Orders were therefore given for boilers and pumps to partially equip five stations, it being expected that the stations would be located approximately as follows:

Woodhaven station, between Spring Creek and Aqueduct.

Shetucket station, on the site of the old deep well station, which had been abandoned on account of the chlorine found in the deep well water.

Morris Park station, located between Oconee and Baiseleys stations.

Lynbrook station, located just west of Lynbrook, Long Island.

Rockville Centre station, located south of the Millburn Reservoir.

The three proposed stations between Spring Creek and Jameco were located with a view of utilizing the water along the shed where the conduit was not pushed to its full carrying capacity. The Lynbrook and Rockville Centre stations were located with a view to pumping the greater part of the water obtained directly into the

48-inch force mains leading from Millburn to Ridgewood station, and in this way increase to a maximum the carrying capacity of the conduit and pipe lines.

Owing to improvements to the existing driven well plants, the starting up of one new station, a fairly good rainfall, accompanied by cool, damp weather, and the careful management of the supply and distribution systems, we were enabled to get and maintain the height of water in the distribution reservoirs normal and higher than it has been for some years past.

The inadequacy of the supply, however, in dry weather was very clearly shown by the rapid falling off in the stored water during September and a part of October. The reduction in stored water from September 1 to and including October 20 amounted to 305,000,000 gallons, and this was during a period when the average consumption was not extremely high. The average rate of reduction in the stored water during this period was 6,000,000 gallons daily, and had this rate continued for an additional fifty days the entire available storage would have been exhausted.

The increase in supply made during the year 1906 from underground sources was approximately as follows:

	Gallons.
New Lots station	2,000,000
Aqueduct station	4,000,000
Jameco deep wells	6,000,000
St. Albans station	2,500,000
Rosedale station	2,500,000
Wantagh gallery	4,000,000
Massapequa gallery, main station	10,000,000
Massapequa gallery, Seaford station	4,000,000
Amityville station	1,000,000
Massapequa emergency station	2,000,000
Total	38,000,000

While this represents the total increase in the ground water supply, it cannot be taken to be a net increase in the supply, as the yield of the surface streams or ponds has been diminished by the development of the underground supply.

At Baiseleys the yield of the filter plant during the month of December of this year, as compared with the month of December of last year, is reduced by 1,500,000 gallons per day. The Springfield Filter Plant has practically been abandoned, as there was only sufficient water in the Springfield Pond to run this plant for twenty-one days since July, 1906.

The gravity supply from the new watershed has been materially reduced by the underground development, the minimum supply this year being about 8,000,000 gallons per day, as compared with the supply of last year, when the minimum supply per day

was about 19,000,000 gallons, this supply being obtained under a much lower rate of rainfall.

The reduction in the surface supply caused by the development of the underground supply was to be expected in a watershed composed mainly of sand and gravel without any impervious surface layer. It is fortunate that the water will be diverted from the surface to the underlying sands and gravels by means of subsurface development, as it is therefore possible to naturally filter practically all the surface supply at a much lower cost than would be possible by any means of artificial filtration. The natural filtration also is absolutely safe, and it is not dependent upon human agency or device for its efficiency. It is therefore clear that the development of the Long Island supply should include provision for ponds or reservoirs located between the well or gallery systems and tide water on the more important streams, and in this way hold the surface flow for a sufficient period to allow it to sink into the sands and then pass to the underground collecting works. By following out this system of development the existing ponds and streams need not be interfered with, and the City will derive the water and at the same time do no harm to the adjoining property by drying up ponds and streams.

The large percentage of water utilized this year for the supply is shown by the slight amount of waste from the various ponds on our watershed. The following table gives a summary of the waste from all ponds:

Month.	Waste From Old Watershed.	Waste From New Watershed.	Total.
January	63,267,200	2,758,000	66,025,200
February	24,063,200		24,063,200
March	126,585,500	14,645,600	141,231,100
April	347,700,000	100,776,000	448,476,000
May	153,255,400	5,748,000	159,003,400
June	9,774,000		9,774,000
July	100,427,800	26,033,000	126,460,800
August		273,990,000	273,990,000
September		88,388,000	88,388,000
October	5,699,700	17,506,100	23,205,800
November	557,300		557,300
December	3,364,100		3,364,100
Total	834,694,200	529,844,700	1,364,538,900

A large portion of the waste on the new watershed was caused by the shutting off of the East Meadow Pond from July 29 to September 15, on account of the discovery of a number of cases of typhoid fever on the Kossel farm located on the Jerusalem turnpike, adjacent to the East Meadow stream.

The development of the deep well supply was provided for by the contract with Mr. Silas W. Titus, for pumping the water from below the clay bed at the Jameco Pumping Station by means of an air lift, and by a contract for approximately eighty wells located at various points along the watershed between Spring Creek and Massapequa. The contract with Mr. Titus has increased the supply at Jameco from 1,800,000 to about 7,000,000 gallons daily, but in order to obtain the supply it has been necessary to lower the water level in the strata below the clay bed about twenty-two feet, and thus induce a flow towards Jameco of the water which otherwise could be obtained at other points. By the City's sinking a new set of wells at Jameco a greater part of the supply which is now being obtained through the air lift system could be obtained by direct suction, and the remainder could be procured by deep wells located along the conduit line east and west of Jameco swamp.

Considerable difficulty has been experienced in obtaining satisfactory material for the deep wells which have already been driven under contract at the Clear Stream, Forest Stream and Rosedale Pumping Stations; and an experimental well, driven by the City's men at the Forest Stream Station showed an excellent sand and gravel strata somewhat over three hundred feet below the surface. The great depth of this strata, however, would make it expensive to develop the supply, and an effort will be made to obtain satisfactory wells with a strainer located at a lesser depth below the surface. The urgent need of an additional supply will require the development of the existing watershed in such a way as to give a maximum yield, and it is proposed to adopt the system that will utilize both the flow above and that below the clay bed or beds.

In January a new 12-inch connection was laid from the 48-inch Mount Prospect force main on Atlantic avenue through Vermont street to Highland boulevard, thus providing a supply of water at sufficient pressure to give a flow on all floors of houses located along Highland boulevard, near Highland Park. The supply for this section had previously been obtained from the New Lots reservoir, and the pressure was not sufficient as a rule to deliver water above the basement floor. After the new connection was made the pressure on the hydrant at the highest point of the system was about twenty pounds. This new connection made it possible to do away with the New Lots reservoir, which was emptied on February 4, and has not been filled since that time. It is expected that the Park Department will take over the land occupied by the reservoir and make it a part of the Highland Park system. The New Lots Station now pumps directly into the distribution system, and a large number of dead ends were eliminated by the abandonment of the reservoir and the change in the system.

Conduit Capacity.

The need of additional conduit capacity for Brooklyn has been felt for several years, and has previously been stated, the location of three proposed temporary plants on the watershed between Jameco and Spring Creek was due to the fact that there was additional conduit capacity on this section of the watershed rather than to the watershed being particularly favorable for additional development. It is now a physical impossibility to transport sufficient water through our present conduits to meet the demands of the consumers during periods of dry weather with high temperature, or during periods of very low temperature. In June, when there was danger of an inadequate supply, it was not due to lack of water, but was due to lack of sufficient conduit capacity and inability to keep up sufficient steam at Ridgewood to operate the requisite number of engines to deliver the required amount of water to the distributing reservoirs.

The maps for acquiring the necessary right-of-way for the new steel pipe line were approved by the Board of Estimate and Apportionment on March 9, 1906, and the Commissioners were appointed on June 5, 1906, taking their oath of office on June 18, when the title was vested in the City. The work of taking testimony and determining on the awards to be made is in progress.

The contract for the portion of the steel pipe line extending from Pitkin avenue to Clear Stream, including the 48-inch cast iron pipe between Pitkin avenue and the Ridgewood station, was advertised, and bids were received on May 23, 1906. The contract was awarded to the lowest bidder, the T. A. Gillespie Company, the total amount of their bid being $1,143,105. Some delay was experienced in having the buildings along the line of the work sold and removed, and it was not until the latter part of August that this difficulty was overcome. Rapid progress has been made by the contractors, and the pipe line is now completed nearly to Jameco, but owing to the delay in authorizing the construction of the emergency stations, there is no supply available for utilizing this conduit. A 20-inch branch line has been run from the conduit to the New Lots station, so that this station could be utilized in case of emergency, to help out the Ridgewood station.

The carrying capacity of this steel pipe line will be slightly over 50,000,000 gallons per day. It is proposed to extend this pipe line from its present terminus at Clear Stream to Massapequa. Even under the most favorable circumstances, this line cannot be completed to Massapequa before its need will be seriously felt.

Quality of the Supply.

The reduction in the amount of surface water and the increase in the subsurface supply has improved the quality of the water furnished, and there has been little or no criticism, except as to the disagreeable odor and taste experienced for a few days on account of diatom growths in the distributing reservoirs. It was necessary, on account of these growths, to shut off the Mount Prospect supply on April 6, and to

cut out Ridgewood Basin No. 3 on August 5, and Basin No. 2, on August 4, Basin No. 1 being practically free from any excessive growths. By treating these supplies with copper sulphate the growths were destroyed, but there will always be more or less trouble until our distributing reservoirs are covered. By covering these reservoirs and developing the underground supply, we will be able to furnish the citizens of Brooklyn a supply that will always be clear and cold and palatable and that cannot be excelled by any other supply in existence.

New mains laid in the Thirtieth and Thirty-first Wards reduced the complaint which is usually caused by the stirring up of sediment in the pipes in the Bay Ridge, Dyker Heights and Fort Hamilton sections, due to the change in the direction of the flow of water of these mains in the early spring and late fall months.

Additions and Improvements in the Supply.

While no additional requests have been made for appropriations during the past year, the work of improving and adding to the supply has been carried out under the appropriations requested in 1905, but which were not approved until 1906. The works now under contract and those for which contracts have been prepared and are ready to advertise, will utilize all the money available, and it is therefore necessary to obtain an additional appropriation before the works which are needed to properly maintain and develop the system, are contracted for.

The work done during the year which has resulted in an increase in the supply has been as follows:

Work Done.	Increase in Supply. Gallons.
Temporary plant at New Lots station	2,000,000
Construction of Aqueduct station	4,000,000
Improvement of Oconee station	500,000
Development of Jameco deep wells by air lift system	6,000,000
Construction of St. Albans station	2,500,000
Construction of Rosedale station	2,500,000
Improvement of Forest Stream station	500,000
Improvement of Clear Stream station	500,000
Completion of Wantagh gallery	4,000,000
Construction of Massapequa gallery (main station)	10,000,000
Construction of west end of Massapequa gallery (Seaford station)	4,000,000
Amityville station	1,000,000
Emergency station on line of Massapequa gallery	2,000,000
Total	39,500,000

While the above figures represent an increase in the supply from subsurface sources, there has been a decrease in the supply from surface sources, due to the development of the underground supply, this reduction representing approximately thirty per cent. of the total increase from the underground supply.

In addition to the works which have directly increased the supply, there should be included the work of driving deep wells at Aqueduct, St. Albans, Rosedale, Spring Creek, Forest Stream and Clear Stream pumping stations, and between Wantagh and Massapequa.

The contractors have driven twelve wells at Forest Stream station; ten wells at Clear Stream station; two wells at Rosedale station; but these wells have not been connected up, and therefore have not increased the supply.

The completion of the new filter beds at Hempstead Pond which filtered the supply from Horse Brook, have enabled the Department to utilize practically all the flow of this stream, whereas formerly only a portion of the flow could be utilized except in dry weather. Contracts have been let for the new Canarsie station, located within the Borough limits, and the work of the remodeling of the Gravesend station has been practically completed as far as the pumping station is concerned; but the delay in constructing the boilers, due to the failure of the contractors, has made it impossible to complete the work of remodeling at this point.

The work of installing the new 20-million centrifugal pump in the Ridgewood South Side station, in place of the old Worthington engine, known as "No. 49," and the installation of four water tube boilers, in place of the Bigelow boilers, and the construction of two new chimneys on the foundation of the existing chimneys, has been prosecuted vigorously since the summer months. A contract for four new engines to be installed in the North Side station at Ridgewood has been let, and bids for remodeling this station will probably be received in the near future, the bids received on November 7, 1906, having been rejected. It is also expected that bids will be received in the immediate future for the boilers, which will complete the work to be done in remodeling the North Side station.

The driven well gangs have been working on repairing and replacing wells, together with driving new wells, and for a portion of the year worked on a 12-hour shift to increase the supply as rapidly as possible.

After having made a careful investigation of the present conditions of the water supply system of this Borough, I have prepared the following list of works to be carried out, together with their estimated cost:

Summary.

Item No.	Title.	Estimated Amount.
1.	72-inch steel conduit, from Clear Stream to Massapequa	$2,000,000 00
2.	Land for additional pipe conduits, and works, etc	1,500,000 00
3.	Infiltration galleries, or other system of collecting the water from Spring Creek to Bellmore	1,000,000 00
4.	Deep wells	500,000 00
5.	Driven well stations within the Borough limits	440,000 00
6.	New high pressure pumping station for the Wantagh infiltration gallery	300,000 00
7.	New high pressure pumping station for the Massapequa infiltration gallery	300,000 00
8.	Emergency stations	160,000 00
9.	Land for protection from pollution	500,000 00
10.	Fencing City property	35,000 00
11.	Repairing Millburn reservoir, and providing bases for columns to enable us to cover it at some future time	750,000 00
12.	Covering Mt. Prospect reservoir	75,000 00
13.	Office for Resident Engineer on conduit line	20,000 00
14.	Four houses for Keepers	80,000 00
15.	Extension to distribution (small mains)	400,000 00
16.	New trunk mains for Eighth, Thirtieth, Thirty-first and Thirty-second Wards	400,000 00
17.	New trunk mains for Seventh, Twenty-third, Twenty-fifth and Twenty-sixth Wards	650,000 00
18.	Removing and relaying mains	750,000 00
19.	Replacing hydrants, placing new hydrants, cutting in gates and making cross connections in the older section of the distribution system, and cleaning mains	500,000 00
20.	Additional supply mains for Clinton avenue and Brooklyn Heights districts	150,000 00
21.	Land for two new pipe yards	50,000 00
22.	Buildings and machinery for pipe and repair yards	100,000 00
23.	Extension of high pressure fire service system for river front, etc., between Navy Yard and Greenpoint	1,100,000 00
24.	Extension of high pressure fire service mains for Gowanus Canal district	425,000 00

Item No.	Title.	Estimated Amount.
25.	New high pressure fire service stations for Greenpoint and Williamsburg districts	525,000 00
26.	Extending the new machine shop at Ridgewood, North Side pumping station, providing new tools and a new residence for the Engineer in charge	60,000 00
27.	Coal shed and coal handling machinery, etc., at the Millburn pumping station	100,000 00
	Total	$12,870,000 00

While the above amount seems large, it will be necessary to expend still more in the near future, the works given covering all the immediate expenditures required, and not covering all the expenditures that will be necessary in the next two or three years.

Unless the development of the water supply system keeps pace with the growth of population of the Borough, it will mean a serious setback to the prosperity of the Borough, and the effect of an inadequate supply or of slow extension of the distribution system will be felt for many years.

Water Surveys.

With the increase in the consumption and decrease in the supply in the late spring and early summer months came the necessity of taking measures to curtail the consumption. Last year a house-to-house inspection was carried on for about two weeks, covering a little over six thousand buildings, and the leakage from defective fixtures in these buildings was estimated at 366,000 per day. In July a second attempt was made to carry out a waste inspection, and we were able, through the courtesy of Mr. Wm. R. McGuire, Water Registrar, to place from sixteen to twenty Inspectors on the work, which was commenced early in July and continued for about four weeks.

The district inspected was bounded by State street, Hoyt street, Gowanus Canal and the East River, and covered an area of 1.4 square miles, within which area were located about 8,500 premises. The following schedule gives a summary of the results obtained:

Leaks found	4,100
Total leakage per day, gallons	815,000
Average leakage per defective tap per day, gallons	200

Work of inspection begun July 2, 1906.

Work of inspection completed July 31, 1906.

Number of Inspectors employed	16
Time consumed, working days	25
Average number of premises inspected per day per man	21

The average leakage in the premises inspected was slightly less than 100 gallons per day, and were this average to be found throughout the City, it would mean an unnecessary waste of water of about 13,000,000 gallons per day.

I have previously recommended that at least twenty inspectors be appointed for this work, and that it be carried on systematically, as the results to be obtained, especially under the present condition of an inadequate water supply, would more than warrant the requisite expenditure.

Distribution System.

General Condition.

The investigation of the distribution system showed that the system was deficient in having many miles of small mains which were so badly tuberculated that they could deliver not more than a small fraction of the water which could be carried by new, clean mains of the same size.

In addition to this difficulty, many of the hydrants connected with the system are antiquated, and in the older sections of the Borough, long distances between hydrants make it very difficult for the Fire Department to quickly get a stream of water on a fire and to obtain efficient streams after the hose lines are run out, especially where there is more than one alarm sent in. The gates on the large and small mains have not been operated with sufficient frequency to maintain them in a satisfactory condition, and the hydrants are not subjected to any regular inspection. Under these conditions, I would recommend that the following work be done:

First—That the work of replacing mains laid prior to 1860 be continued in the future at even more rapid rate than in the past few years, and that the old mains be cleaned on residential streets, where such mains would be of sufficient capacity after cleaning to meet the domestic and fire service needs of the section.

Second—That the work of cutting in new hydrants and replacing antiquated hydrants be carried out as rapidly as possible, as this work will mean a great increase in the fire-fighting efficiency of the system at a comparatively small cost.

Third—That all mains that are not cross-connected be cross-connected, and gates so placed as to reduce the area from which the water will be cut off in case of repairs.

Fourth—Establishing without delay adequate inspection and repair gangs for the gates and hydrants, so that systematic testing and repairing of all gates and hydrants will be carried out.

The list of works required, as already given, shows that a large amount of work will have to be done to bring the system up to the proper standard and to provide for

the growth of the Borough by extending the water mains and by laying new trunk mains to carry the necessary water to meet the increased consumption.

Fire Insurance Investigation.

The report made by the Committee of Twenty of the National Board of Fire Underwriters on the condition of the water supply in this Borough, carried with it many recommendations that had been made by the Department with a few additional recommendations which had not been covered in the Department reports. The system of mains outlined by the Department met with the full approval of the Committee's engineers, and no additional mains were recommended.

An effort will be made to carry out any recommendations of the fire insurance interests that will tend toward a reduction in the comparatively high insurance rates now paid by the citizens of this Borough.

The work already done by the Department bore fruit in a reduction of 20 per cent. in the rates in what was known as "District No. 1," and this reduction was extended this year so as to cover what is called the "Kent avenue District," extending along the East River from Hewes street to Calyer street; and this fall the reduction in rates was still further extended to cover the territory bounded by the East River, North Thirteenth street, Bedford avenue, Flushing avenue and Heyward street. The reduction in rate was, however, only 10 per cent., while the increase charged, due to inadequate supply, was 20 per cent. The Department is now working on plans which, when carried out, promise to result in a general reduction of 20 per cent. in the rates in the Williamsburg and Greenpoint sections.

Pressures.

The pressure maintained in the system has been in the main satisfactory, with the exception of the night hours, when the pressure was reduced so as to curtail unnecessary waste during the late hours of the night and the early morning hours. Where a complaint was made of inadequate pressure in the sections adjoining the Mount Prospect reservoir and tower services, extensions have been made to these services so as to cover the district in which the complaint was made.

The laying of the 12-inch main on Vermont street, which was connected to the 48-inch Mount Prospect main on Atlantic avenue, made it possible to place the Highland Boulevard section on this service, and do away with the New Lots reservoir. This change greatly increased the pressure on the high section adjoining Highland Park, and made it possible to open many of the gates on the New Lots system.

The laying of the 30-inch and 24-inch mains on Fort Hamilton avenue, together with the 20-inch main laid on Seventy-ninth street and Tenth avenue, gave a much-needed relief to the section through which this main was laid, and when the water was turned on, on November 1, the increase in pressure was during the morning hours, approximately fifteen pounds. The laying of this main will also prevent to a great ex-

tent the stirring up of the sediment in the pipes in the Bay Ridge and Fort Hamilton and Dyker Heights sections, which has previously occurred in spring and fall, when the change in consumption in the Coney Island, Bensonhurst and Bath Beach sections has necessitated a change in the direction of flow in the mains.

Maintenance of Distribution.

The system established last year of having an Assistant Engineer on duty every night within telephone call, and of having fully equipped night gangs in all the repair yards, has been continued throughout the year. The fire alarm details at the Western District and at the East New York yards have also been continued with marked success.

The work of maintenance of and repairs to the Distribution System has been carried on zealously, extensive and efficient work being done by the men at all the repair yards repairing hydrants, gates, leaks in mains and service pipes, etc. As an instance of the extent and importance of the work done by the repair yards, it may be mentioned that during the year, 169 additional new hydrants were set, 267 new and 922 good hydrants set in place of useless ones, 6,816 hydrants repaired and 5,068 pumped and thawed out.

Extension to Distribution.

The work of extending the water mains has been continued both under the general form of contract for hauling and laying water mains and by the Department men.

During the year the number of streets for which petitions were received to lay water mains was 232, of which 218 were reported on favorably, recommending the laying of 1,073 linear feet of 20-inch pipe, 260 linear feet of 16-inch pipe, 16,917 linear feet of 12-inch pipe, 152,350 linear feet of 8-inch pipe and 1,645 linear feet of 6-inch pipe.

The work done by the Department men was as follows:

Size of Main.	Linear Feet Laid.	No. of Gates Set.	No. of Gates Removed.	No. of Hydrants Set.	No. of Hydrants Removed.
36-inch		2	2		
30-inch		1	..		
20-inch		3	2		
16-inch		1	..		
12-inch	330	8	2		
10-inch		1	..		
8-inch	23,707	40	14		
6-inch	2,050	134	42		
4-inch		5	..		
Total	26,087	195	62	1,348	1,181

The work done under contract was as follows:

Contract for hauling and laying water mains, Isaac Harris, contractor, dated September 25, 1905:

Size of Main.	Linear Feet Laid.	Gates Set.	Hydrants Set.
20-inch	3,549	8	
16-inch	2,610	7	
12-inch	19,282	51	
8-inch	53,636	160	
6-inch	10,831	316	
Total	89,908	542	345

Removal of Old Mains.

Work on the contract for laying new mains and removing existing water mains in Graham street, and in the section bounded by North Thirteenth street, Wythe avenue, Flushing avenue and Kent avenue, was begun on April 23, and completed on October 15. This work has already resulted in causing a reduction in the insurance rates in that section.

The total work done was as follows:

Contract for laying water mains and removing existing water mains in Wythe and Franklin avenues, etc. Thos. O'C. Sloane, contractor, dated October 11, 1905:

Size of Main.	Linear Feet Laid.	Linear Feet Removed.	Number of Gates Set.	Number of Gates Removed.	Number of Hydrants Set.	Number of Hydrants Removed.
20-inch	30	30	1			
12-inch	14,076	5	57			
8-inch	11,566	98	108			
6-inch	1,381	25,087	169	42		
Total	27,053	25,220	335	42	169	36

A contract has been prepared for relaying mains in various streets where the condition of the old mains is particularly bad. Bids for this work will probably be received early in the coming year and work started at the beginning of the summer.

There are other sections of the Borough, especially the Greenpoint and Williamsburg districts, where the old mains, laid prior to 1860 and badly tuberculated, should be replaced by new and larger mains. An appropriation for this purpose has been asked and a contract and plans for the work are in course of preparation.

Summary of Other Work Done.

Other work done in laying mains is shown in the following tables:

Contract of laying mains in Fort Hamilton, Gravesend, First, Eighth avenues, etc. Isaac Harris, contractor, dated May 22, 1906:

Size of Main.	Linear Feet Laid.	Gates Set.	Hydrants Set.
30-inch	4,052	5	
24-inch	4,043	5	
20-inch	7,243	11	
16-inch	1,060	2	
12-inch	204	4	
8-inch	2,466	38	
6-inch	810	101	
Total	19,878	166	82

Contract for new 30-inch delivery main from new Gravesend Pumping Station, James P. Graham, contractor, dated November 6, 1905:

Size of Main.	Linear Feet Laid.	Gates Set.	Hydrants Set.
30-inch	1,806	6	
20-inch	6	1	
16-inch	95	..	
12-inch	35	1	
6-inch	10	1	
Total	1,952	9	1

Contract for new 24-inch delivery main from New Lots Pumping Station. Isaac Harris, contractor, dated March 26, 1906:

Size of Main.	Linear Feet Laid.	Gates Set.	Hydrants Set.
24-inch	2,118	6	
16-inch	256	3	
12-inch	40	1	
8-inch	129	5	
6-inch	68	7	
Total	2,611	22	7

Contract for laying 20-inch main from the 72-inch Steel Pipe line to the New Lots Pumping Station. James P. Graham, contractor, dated August 25, 1906:

Size of Main.	Linear Feet Laid.	Gates Set.	Hydrants Set.
20-inch	3,058	7	
16-inch	86	2	
8-inch	57	3	
6-inch	93	10	
Total	3,296	22	10

Contract for 24-inch delivery main from the new Canarsie Pumping Station. Hammond & Sloane, Inc., contractors, dated September 11, 1906:

Size of Main.	Linear Feet Laid.	Gates Set.	Hydrants Set.
24-inch	4,137	5	
16-inch	10	..	
12-inch	6	..	
8-inch	6	..	
6-inch	122	15	
Total	4,281	20	15

Contract for tapping 20-inch and 30-inch mains and hauling and setting hydrants. Thomas O'C. Sloane, contractor, dated December 22, 1905:

Size of Main.	Linear Feet Laid.	Gates Set.	Hydrants Set.
6-inch	2,691	378	378

Table No. 13, attached hereto, shows the total number of mains laid this year, together with the mains laid previously. Table No. 15 shows the streets and limits in which mains were laid during the year.

High Pressure Fire Service System.

Mains.

The work of laying the high pressure fire service mains was resumed by the contractor, John J. Cashman, on March 28, 1906. The total amount of work done during the year was as follows:

Size of Main.	Linear Feet Laid.	Gates Set.	Hydrants Set.
20-inch	19,258	55	
16-inch	23,975	76	
12-inch	36,737	92	
8-inch	3,462	510	
Total	83,432	733	465

The work to be done under this contract is now practically completed, except the laying of a few intersections and the setting of about 225 hydrants. It is expected that the work will be entirely completed by May 1, 1907.

By means of connections to the distribution mains at Hamilton avenue and Van Brunt street, and at Adams and Johnson streets, the high pressure service mains have been practically all filled with water from the distribution system, thus placing about 400 hydrants in commission for the use of the Fire Department for fire purposes, pending the completion of the high pressure fire service pumping stations.

Table No. 14 shows the high pressure fire service mains laid to December 31, 1906, and table No. 16 gives the streets and limits in which high pressure mains were laid during 1906.

Pumping Stations.

Bids were received on August 15 for the work of construction of the main and reserve high pressure fire service stations. Mr. Charles H. Peckworth was the lowest

bidder for both stations, his bid for the main station being $64,422 and for the reserve station $45,423. The contracts were awarded to Mr. Peckworth, and he was ordered to begin work on both stations on November 5. Work was started on the reserve station at Willoughby and St. Edwards streets on November 10, and all of the concrete walls below grade are now in place and the contractor has commenced the brickwork. At the main station, on Furman and Joralemon streets, work was commenced on November 10. The greater part of the excavation has been completed at this station and some of the concrete for the footings has been put in place.

Motors and Pumps.

Bids for the motors and pumps were received on July 19, 1905, the D'Olier Engineering Company being the lowest bidders for the work at both stations. Owing to litigation, however, the contracts were not awarded to them until April 25, 1906. The contractors were ordered to begin work on the equipment for both stations on May 21, 1906. The contractors have submitted plans of multi-stage centrifugal pumps, arrangement of oil switches, bus bars, switchboards, etc., as well as of the arrangement of piping and trenches, all of which have been approved. Work at the shops has progressed satisfactorily, two of the motors being almost finished, and work is being pushed on the pumps. The completion of the work on these contracts will depend in a large measure upon the progress of the pumping station buildings.

Salt Water Suction Mains.

Contract and specifications and plans for the salt water suction mains for the main station at Furman and Joralemon streets are being prepared and will be forwarded for printing early in the coming year. The suction mains will consist of three parallel lines of 24-inch pipe running from the station through Joralemon street and the yard of the New York Dock Company to and through the bulkhead at Pier 18, East River, and of a suction box, well and intake to be built near the bulkhead at the same pier, if permission can be obtained from the New York Dock Company.

Extensions.

Estimates of cost have been made and specifications and plans are being prepared for extensions of the high pressure fire service system for the river front, etc., between the Navy Yard and Greenpoint, and for the Gowanus Canal district. Appropriations for this work have been asked, as well as for a new high pressure fire service station for the Greenpoint and Williamsburg district amounting to $2,050,000.

Coney Island System.

The high pressure fire service system at Coney Island gave satisfactory service during the year. The number of alarms received at the station from the protected district averaged a fraction less than two per month. In all instances the pressure was on the fire mains when the firemen arrived at the scene. They found no difficulty in immediately controlling the fires; the only criticism made by the Fire Department

has been that of too much rather than too little pressure. The equipment at the station is tested every day and kept ready for service at an instant's notice.

On November 22 a working test at the station lasting forty-five minutes was made by the Fire Department, under the personal supervision of Fire Chief Edward F. Croker, hydrant and nozzle pressure being taken by the Firemen. The following table shows the results of the test:

Size of Nozzle.	Length of 2½-inch Hose. Feet.	Pressure at Nozzle. Pounds.	Calculated Discharge. Gallons Per Minute.	Total Gallons Per Minute.
Hydrant No. 1—				
1⅜ inches	100	60	450	
1¼ inches	100	90	440	
1¼ inches	100	75	410	
				1,300
Hydrant No. 2—				
1¼ inches	150	60	360	
1¼ inches	150	60	360	
1¼ inches	150	52	*340	
1¼ inches	150	50	*330	
1¼ inches	150	52	340	
				1,730
Hydrant No. 3—				
1¼ inches	150	50	330	
1¼ inches	150	50	*330	
1¼ inches	150	50	*330	
1¼ inches	150	50	330	
				1,320
Total delivery				4,350

Hydrant pressure, 125 pounds.

Pressure at station, 132 pounds.

The foregoing results show that the system is as efficient as shown on previous exhibition and official tests. All the streams obtained were excellent fire streams; some of them would be termed "unusually strong" streams and difficult to hold nozzle without special appliances.

The grounds at the pumping station have been seeded and sodded, and also fenced, thus materially improving the appearance of the station.

Seventy-two-Inch Steel Pipe Line.

Owing to the need of additional conduit capacity for Brooklyn, a need which has made itself felt for a number of years, it was decided to lay a 72-inch steel

main from the City line to the end of our watershed, and as the present policy of the Department is to do away with the repeated pumping of water, which was a feature of the old system of supply, it was decided to make this steel main a force main, and to install pumping machinery at the new infiltration gallery systems capable of pumping water from the sources of supply through the steel main direct into the distribution system and the Ridgewood Reservoir.

The funds which were available were sufficient only to allow of contracting for that portion of the steel pipe line which extends from Pitkin avenue to Clear Stream pumping station, including a 48-inch cast iron main between Pitkin avenue and the Ridgewood station. The contract for this work, as previously said, was awarded to the T. A. Gillespie Company, and they were ordered to begin work on June 19.

The contractor has carried out the work with exemplary diligence, and up to date there has been completed in all about 24,000 feet, which brings the end of the completed steel pipe line to about opposite our Jameco pumping station. All of the 48-inch pipe (about 4,300 feet) has been laid, and the work still remaining to be done on this part of the contract is about some fifty (50) feet of cast iron pipe, in order to make the connection to our old conduit at the Ridgewood pumping station, so that, if necessary, it could be used in an emergency to supplement the carrying capacity of the conduit. It is very essential that the necessary funds be obtained to permit of extending the steel pipe line to Massapequa in the near future.

Driven Wells.

Considerable work was done by the driven well gangs, cleaning and repairing old wells and driving new wells at various stations. New plants were put in at Amityville and Seaford, and work is being done on the new plant at Morris Park.

On July 25 bids were opened for furnishing and driving deep wells at Aqueduct, St. Albans, Rosedale, Spring Creek, Forest Stream and Clear Stream pumping stations, and between Wantagh and Massapequa. The lowest bidder was George W. Phillips, the amount of his bid being $64,401.55. The contract was awarded to Mr. Phillips, and he was ordered to begin work on October 1. The contractor has done work at Forest Stream, Clear Stream and Rosedale stations.

Contract and specifications and plans for sinking shallow wells at Gravesend and Canarsie and for driving deep wells at Spring Creek are being prepared. Bids for this work will probably be received early in the coming year.

A contract and plans for same have also been prepared for driving or sinking deep and shallow wells at Oconee, Baiseleys, Springfield, Watts Pond, Woodhaven, Shetucket, Lynbrook and Rockville Centre pumping stations. This contract will be advertised early in 1907.

Pumping Stations.

Mt. Prospect.

The amount of water pumped into the reservoir system at this station was comparatively slight, as the Davidson engines at Ridgewood have furnished an adequate

supply to the system. As a result the reservoir engines at this station were in operation only about 140 days during the year. On the tower service the pumping has been increased from a daily average during 1905 of 4,582,000 gallons to a daily average during 1906 of 5,307,000 gallons, and since July the tower has been kept practically full during all hours of the day and night, so as to furnish adequate pressure at the high points of the tower system.

Owing to the increased consumption in the districts supplied by the tower service it has been and will continue to be necessary to operate the steam turbine pumping engine at this station, in connection with one of the other engines, continuously day and night. This turbine engine, when running, makes such a noise as to be very annoying to the immediate neighborhood. I fear that the Board of Health will be asked to have this engine shut down over night. Complaints were made in the past concerning the operation of this engine, and efforts were made to obviate the trouble, but apparently without success. This engine could be utilized elsewhere in the service, where it would not be a nuisance, and therefore I think it advisable to replace it with another one.

A contract has been awarded to Messrs. Hammond & Sloane for a new 24-inch suction main for this station, which is badly needed. Work on this main will be commenced as soon as weather permits, and it is expected that it will be in service sometime in May, 1907.

The old steam pipe from the boilers to engines No. 3 and No. 4 at this station has been removed, and a new 5-inch line installed in its place. The old boiler feedwater heater, which was worn out and leaked badly, has been replaced by a new one. The old circulating pump for the boilers has been replaced by a new Davidson pump, of the same size as the feed pumps, and connected so as to feed the boilers from both the reservoir and tower mains. Engines Nos. 3 and 4 have been overhauled, also the air pumps for these engines. It was found necessary to replace the ball-bearing of the turbine engine. No repairs to the boilers have been necessary, they being in good condition.

Gravesend.

The average amount of water pumped per day at this station was 2,915,000 gallons. Only minor repairs were necessary during the year, except to Worthington engine No. 1, which was thoroughly repaired by the maker.

The work on the new station has been practically completed, there remaining only a few finishing touches to be done. The Snow Steam Pump Works, the contractors for the installation of the new engine at this station, have delivered and erected the engine, but have not finished up the small work around same, as until the boilers are installed the engine cannot be tested and turned over to the City. The United Heating Company, the contractors for the boilers, having failed in business, and no satisfaction having been obtained from the securities, their contract was considered abandoned, and it was readvertised, bids being received on October 31. The

contract was awarded to the lowest bidder, Mr. Thomas F. Purcell, the amount of his bid being $11,700. The contractors for the steamfitting, Messrs. William Horn & Co., have delivered the feed and vacuum pumps and open heater on the ground, but have not been able to do anything further on their contract by reason of the boilers not being in place. The completion of this work will depend upon how soon the boilers are installed. Contracts for sinking the shallow wells and laying suction mains and for the grading required at the station have been forwarded. These contracts will be advertised early in the coming year.

New Utrecht.

The average amount of water pumped per day at this station was 1,559,000, slightly under the average amount pumped last year. The engines at this station were in bad condition, and an order was given to Mr. H. R. Worthington to repair same. He is now doing the work of overhauling them.

Canarsie.

On May 2, 1906, bids were received for the erection of the Canarsie Pumping Station, a new driven well station to be located near Avenue D and Remsen avenue. The lowest bidders were Richard Whalen & Co., the amount of their bid being $23,781. The contract was awarded to them, but was later assigned by them to Henry Newman. The contractor was ordered to begin work on September 12. Quite some work has been done by the contractor on excavation up to December 19, when work was suspended.

On May 2 bids were also received for the erection of the two pumping engines at this station. The contract was awarded to the lowest bidders, the Marine Engine and Machine Company, and they were ordered to begin work on July 20. Most of the heavy castings for the engines have been made and work is being done in the machining of the same.

The contract for the boilers was awarded to B. Franklin Hart, Jr., & Co., and they were ordered to begin work on them on June 25. The contractors have completed all the shop work on these boilers, and they have been shipped. They cannot be erected, however, until further progress is made with the building.

Bids for the steam heating were received on May 2, and the contract awarded to Blake & Williams, the lowest bidders. No work can be done on this contract until the boilers are in place and the building under way.

On August 29 bids were received for doing all the grading, etc., at this station, the Newman Construction Company being the lowest bidders. The contract was awarded to them, and they were ordered to begin work on November 12. Some work of excavation has been done by the contractors.

A contract for the sinking of the wells and the laying of the suction mains at this station has been prepared and forwarded.

New Lots.

Through the installation of a temporary plant at this station the average amount of water pumped per day has been increased by about 2,500,000 gallons. The temporary plant was installed and connected by the Department men, and it was started on July 5. Only minor repairs have been necessary at this plant since it was put in operation.

The engines and boilers at the old station have been in constant operation throughout the year, and only stopped for minor repairs. The pistons of the pumps have been fitted with new glands and bolts on the water end. The boilers at this plant have had the brick work and the blow-off and water-column piping repaired. The tubes of these boilers require attention, and as soon as the new pumping plant is in operation they will be overhauled. The smokestack for these boilers was blown down and a new one has been erected.

The contractor for the erection of the new pumping station has completed all the work under his contract, and the final estimate was forwarded on October 1, 1906.

B. Franklin Hart, Jr., & Co., the contractors for the boilers, have also completed the work on their contract, and the boilers have been in use since July. The contractor for the steam fitting has been greatly delayed by the noncompletion of the pumping engines, but has taken measurements and expects to complete his work as soon as the second pump is installed.

The Marine Engine and Machine Company, who have the contract for the two pumping engines at this station, have one pump nearly completed, and most of the second pump has been shipped. Both of these pumps should have been ready for operation on August 23.

Ridgewood, North Side.

On April 4, 1906, a contract was entered into with Mr. Walter E. Parfitt, for the preparation of plans and specifications for the remodelling and enlarging of this station. After the completion of the plans and specifications, the contract was advertised and bids received on November 7. These bids were, however, rejected, and the architect directed to make the necessary changes in the plans and specifications. It is expected that the contract for this work will be readvertised early in the coming year.

Bids were received on July 25 for the erection of two 23,000,000 gallon and two 15,000,000 gallon pumping engines in the remodelled station; the lowest bidders were the Davis & Farnum Manufacturing Company, and the amount of their bid was $340,000. The contract has been awarded to them.

On December 26, bids were received for installing eight water tube boilers at the new station, the Heine Safety Boiler Company being the lowest bidders.

On September 26, bids were received for the erection of a new machine shop and office at this station, and the contract was awarded to the lowest bidder, Mr.

Charles H. Packworth. The contractor was ordered to begin work on December 12. The concrete work below grade has already been completed by him, and some work has been done on the brick walls.

Beam Engine.

This engine was fitted with a new set of United States packing rings. New valves were put in main pump; new heater was put into main line to the boiler feed pump; the air pumps were repacked, foot and delivery valves overhauled, new set of metallic packing rings were put in the main piston rod boxes, the main links and crank pins were overhauled. The brasses on the crank pins cracked, and were replaced with new ones. New frame and screen was made and placed in well. This engine is in fair condition.

Triple Expansion Engine No. 1.

The pumps were examined and 200 old valves were replaced; the stuffing boxes were repacked, and new service water pipe and primary heater were placed. Leaky jacket connections and minor repairs as were found necessary to keep the engine in constant operation, were made, these including piping primary heaters, suction pipe repairs, etc. This engine, when the new engine in the South Side plant is installed and ready for operation, will have to be put out of commission, examined and thoroughly overhauled. This engine has been in constant operation during the past year, with the exception of a few hours now and then to make the repairs mentioned.

Triple Expansion Engine No. 2.

Necessary packing was made on the rods, valves and compensators, to keep the engine in operation, and 250 new valves were placed in the pumps. The primary heater was repaired and new tubes replaced; the high-pressure valve stem was repaired, the condenser overhauled, and a number of new tubes placed. This engine will be stopped as soon as the opportunity presents itself to make temporary repairs. The well of this pump was examined and thoroughly cleaned.

Triple Expansion Engine No. 3.

This engine was stopped a number of times for a short period to examine the pumps; new valves were placed as required; stuffing boxes were repacked where necessary. The well of this pump was examined and the screens thoroughly cleaned. This engine will also have to be put out of commission when the new South Side plant is in operation.

Davidson Engines.

These engines have been kept in constant operation and only stopped for a few hours, from time to time, to allow pump examinations, replacing of pump valves, adjustment of steam valves, etc. New cast iron plungers were made and placed in the water ends and new pump valves put in. Packings were renewed continuously. Valve chambers of air pumps of Nos. 1 and 2 were refitted with a complete set of

valves and springs. The condenser was refitted with new water service piping, the feed pumps to the boilers were thoroughly overhauled and repaired, new valve glands and stuffing boxes placed.

The contract to repair the steam ends on these engines has been awarded to the Davidson Pump Company, but to date we have been unable to allow the contractors to begin work, owing to the necessity of keeping the engines in operation. When the new engine is in service the contractors will be notified to commence work. These engines, at their best, are extravagant to maintain and operate, and will be replaced with engines of a modern type now contracted for.

West Side Boiler Plant.

During the past year these boilers have had no repairs, only cleaning and washing at regular intervals. The stop-valves on all these boilers were repacked from time to time. The boilers are in fair condition. The New York Grate Bar Company, who have the contract to install the "Coe Combustion System" on these boilers have made very little progress. We have made every effort to make them complete their work, and as we have made no provision for the supply of broken coal (the kind used in this battery), this work should be pushed to completion as quickly as possible.

Morris Boilers.

The repairs to these boilers, made by contractors B. Franklin Hart, Jr., & Co., are about completed; the last boilers having been tested on September 18. The safety valves on boilers Nos. 3, 5 and 10, and the relief valve on Nos. 1, 2, 3, 4 and 10 have been repaired and new gauge cocks fitted on the boilers. In boilers Nos. 2, 4, 6, 9 and 10 new bridge walls were placed. In boilers Nos. 4, 5 and 6 feed piping was repaired. No. 10 boiler was fitted with a new 6-inch stop-valve; the 12-inch main steam line was repaired; new steel rods were placed in the feed pump; the jacket return pumps were fitted with new tool steel rods, new valves and plungers. Patterns have been made and sent to the foundry for new grate bars for the Beggs boiler.

Davidson Boilers.

These boilers are in fair condition. The New York Grate Bar Company have completed the work of installing the "Coe Combustion System." New bridge walls were placed and the furnaces were relined in boilers Nos. 14, 15 and 19. These boilers have been washed and cleaned regularly, and the buckwheat size coal is now being used on the same.

Coal Conveyor.

This conveyor, owing to the increased consumption of coal since the buckwheat size has been introduced, has been kept in service continuously. Minor repairs have been made from time to time as were found necessary.

Ridgewood, South Side.

On May 16 a contract was awarded to Messrs. Donegan & Swift, for the installation of a temporary boiler plant at this station, so as to allow us to take out the old boilers which are to be replaced by new water tube boilers. This temporary boiler plant was put in service the latter part of October, and has been kept in constant service ever since.

The contract for the new water tube boilers was awarded to R. F. J. Gerstle Company, and he was ordered to begin work on March 3. The contractors have taken out the old boilers and have started on the erection of the new ones. All of the material is on the ground and progress is being made on their erection.

On September 21, 1905, a contract was awarded to H. R. Heinicke, Inc., for erecting two new brick chimneys at this station, but the contractors were not allowed to start taking down the old east chimney until October 1, 1906. Very good progress has been made on the erection of the new chimney, which is now nearly completed.

The contractors for the temporary pump at this station, the Borough Construction Company, were not allowed to start work on their contract until October 1. They have made very rapid progress in the dismantling of the old pump and the erection of the new. They are practically ready to put the pump in operation as soon as we are able to furnish them steam from the new boilers.

Worthington Engine No. 1.

This engine was refitted with new accumulator rams, new gland stuffing box, bushing and bolts and new compensating cylinder rams were fitted. The pumps on this engine were thoroughly overhauled, 208 valves, 100 valve plates and 50 valve springs were placed. Owing to the bad condition of the engine, the main and cut-off valve rods had to be repacked or readjusted a great deal oftener than would otherwise be necessary.

Worthington Engine No. 2.

The main and cut-off valves and rods were packed regularly, and charging valves were repaired; compensating cylinder and accumulator were repacked regularly. The pipe connections on jacket trap were renewed and trap repaired. The pump end was examined and valves, plates and springs replaced with new ones where necessary.

Worthington Engine No. 3.

The main cut-off valves and rods and the compensating cylinder and accumulator were packed regularly, the air pumps were overhauled and packed and new rods placed in same, new air valves and charging valves were placed.

Worthington Engine No. 4.

The main cut-off valves and rods and the compensating cylinder and accumulator were packed regularly, the pumps were overhauled and valves and springs replaced

where necessary. This engine showed signs of serious jacket leaks in the cylinder head; experiments were made with the object of cutting out jacket steam from the cylinder head by by-passing them; this experiment was not entirely satisfactory, but was quite an improvement over the previous condition.

Worthington Engine No. 5.

This engine has been completely overhauled by H. R. Worthington, on a departmental order, and since these repairs have been made the engine has given good service until the latter end of December, when we experienced considerable trouble with the pump valves, it appearing that the holes in the valves were too small, causing them to bind hard on the valve guard.

In addition to this trouble, the high pressure piston on No. 1 side worked loose and broke the piston and rings. New pistons were ordered from H. R. Worthington, and prompt delivery of same is expected, so we can place the engine in service again. The breaking down of this engine has seriously crippled the service.

The walnut lagging on these five engines is in a disgraceful condition, and in a short time it is proposed to remove same and cover these engines with Russia iron lagging.

Engine No. 49.

This engine was kept in constant operation until the early fall, when it was dismantled and removed during the month of October, under a contract with the Borough Construction Company of Brooklyn.

The twenty-million-gallon centrifugal pump to replace this engine is installed and will be put into service when the contractor furnishing the new water tube boilers and piping has connected up the same.

The air pump discharge on this new engine has been connected to a large iron tank placed by the Department. This tank will be connected to a pump and its contents discharged into the sewer. The object of placing this tank was to receive all the drips and drains from the main engines that formerly were allowed to drain into the cellar and from thence into the conduit.

Strong Boilers.

During the year the furnaces in the boilers of this battery were repaired, new dead plates were placed and the arches were rebuilt. They have been kept in constant service since late in the summer, only have been out of service long enough to make temporary repairs. The tubes in these boilers are in bad shape and will be removed as soon as the new water tube boilers are placed in service. The main stop valves are also in bad condition, and owing to this we are compelled to disconnect piping on boilers in order to allow men to go inside to scale same. These valves are also to be renewed. The blow-off piping has been removed during the year.

The New York Grate Bar Company completed their work of installing the "Coe Combustion System" in this battery. Buckwheat size coal is now being used entirely.

Bigelow Boilers.

This battery was kept in service until October, when the temporary boilers on the east and west sides were connected and put into service to replace same. R. Gerstle & Co. have dismantled and removed this battery and are now installing the new water tube boilers.

The West Side Temporary Boiler Room.

The four locomotive boilers in this battery, including the steam piping, etc., were furnished and installed by Messrs. Donegan & Swift, of New York. This battery was placed in service the latter part of October, 1906, and has been kept in constant service ever since, with the exception of a short time to make repairs to grate bars. The boiler house or shed was completed about the first of November by the Department force.

The East Side Temporary Boiler Room.

This battery of three locomotive boilers, two of which were furnished and installed by the Borough Construction Company of Brooklyn, and the other moved from the temporary plant at Spring Creek, were connected up by the Department force, and were placed in service in conjunction with the four boilers in the west boiler room.

This comprises all the boilers installed to replace the Bigelow battery

They have been kept in constant service since their installation.

During the last quarter the old stack on this side was removed and the Heinicke Company has about completed a new one.

Dynamo Room.

The dynamo has been run throughout the year; only minor repairs have been found necessary.

The coal conveyor for this station on the south side is in poor condition, and we have been compelled to call upon the C. W. Hunt Company (the makers) to repair same. Owing to the limited amount of time that could be spared, we have made only such repairs as would keep it in service. The engine is also in poor condition and every effort will be made to put it in good condition as soon as possible.

Spring Creek.

Engine No. 1 at this station has been refitted with new water cylinder linings, new rods and new water pistons and other minor repairs were made. The water ends on the Davidson pump were overhauled, pistons repacked and defective valves removed and new ones placed. The boilers at this station have been fitted with the "Coe

Combustion System" by the New York Grate Bar Company. The superheaters installed during the year are giving satisfactory results.

The temporary plant was shut down on March 15 and subsequently dismantled, one of the vertical boilers being removed to Amityville and the Davidson pump being removed and installed at the St. Albans pumping station.

Aqueduct.

This plant was put in operation in the middle of February, and has done continued pumping since then. Only slight repairs have been necessary.

Oconee.

During the first quarter of the year the Davidson pump and boilers were taken from the Shetucket plant, which had been abandoned, and installed at this station. This was done to insure continuous pumping when it was necessary to shut down for repairs. The furnace of the old boiler was relined. The water cylinders of the pumps are in bad condition and will have to be replaced.

Baiseleys.

One engine and one pump were kept in constant operation; only minor repairs were found necessary.

Jamaica.

The Davidson pump was run continuously throughout the year, with the exception of shutting down for small repairs. The steam end of this pump is in bad condition and an order has been given to M. T. Davidson to put the same in good condition.

Slight necessary repairs were made to the Worthington engine. The centrifugal pump used in connection with the Baiseleys filter plant has been run continuously during the year, with the exception of a short shut-down in the fall for some slight repairs to the engine and to repair a crack that appeared in the meter. Minor repairs have been made to the boilers at this station, but there has been no opportunity to put the boilers out of service long enough for cleaning, etc.

St. Albans.

This plant was put in operation the latter part of 1905. The two centrifugal pumps installed at this station by Messrs. Donegan & Swift have given continuous trouble since their installation. Every effort was made to repair them and keep them in running order, and finally the contractors were notified to remove them to their shops, rebuild them and return them to the City when in good condition. To take the place of these engines the Davidson pump from the abandoned temporary plant at Spring Creek was removed to this station and erected by the Department men. The boilers have given good service, no repairs being needed.

Springfield.

During the year the Davidson engine at this station was refitted with a new lining, and a new water piston, furnished by M. T. Davidson, was placed in this pump; the steam end and water cylinder were thoroughly overhauled. The engine is now in good condition. The filter engine has been run when required and has given satisfaction. Minor repairs were made to boiler No. 1. Boiler No. 2 is in good condition.

Rosedale.

This plant was started in the early part of the year and has been running continuously since. no repairs of consequence have been necessary.

Forest Stream.

This plant has been kept in constant operation all the year, except when the engines were shut down for repairs. Minor repairs were made to both engines and boilers.

Clear Stream.

This station has run the whole year and only minor repairs have been necessary.

Watts Pond.

This plant is old and the engine and boilers are in very bad condition. The engine has been kept running all the year with good results, considering the poor condition of the plant. Only ordinary repairs have been made. The air pump has been overhauled and put in good condition. The boilers at this station are in a very bad condition and will have to be replaced.

Smiths Pond.

Engine No. 1 at this station was completely overhauled. A new steam chest cam shaft and pin have been ordered from M. T. Davidson for engine No. 2, and will be put in place as soon as the engine can be shut down long enough for the purpose. Necessary repairs have been made to the boilers.

Millburn.

This station has been in operation during the entire year and only stops of short duration were made. The pumps were refitted with valves, springs and guards when necessary. The valve motion on the Davidson engines was repaired from time to time, and these engines are now in fair condition. The Worthington engines are not in the best of repair, and at the first opportunity they will be stopped and overhauled. The dynamo engine has been overhauled and is now in good condition. The boilers at this station are in very bad condition. The tubes on both batteries will have to be renewed. Some work has been done in renewing the tubes of the boilers of the east battery; when this is completed the same will be done to the west battery of boilers.

Minor repairs have been made to engines and boilers at Agawam, Merrick, Matowa, Wantagh and Massapequa.

Seaford.

This station was started on August 20 and ran for a few days, when it was shut down on account of a broken cylinder-head; necessary repairs were made and the plant was again started on August 28, and has since been running continuously, with the exception of a number of short shut-downs to make repairs to the boilers.

Amityville.

This station is situated near the Suffolk County line. It was run for a short time last spring and then shut down. It was again started on September 19. About the middle of October it was again shut down and dismantled.

Ponds, Conduits and Reservoirs.

The usual work of patrolling and cleaning the ponds and streams, and of protecting the supply from pollution, has been carried on during the year under the supervision of Superintendent G. V. Brower.

The following table gives a summary of the work done in cleaning closets and cesspools to prevent surface pollution of the supplies:

Near Foster's Meadow stream	1,768
Near Springfield stream	2,755
Near Valley Stream and Pines Brook	1,106
Near Millburn stream and Schodack Brook	829
Near Wantagh and East Meadow streams	1,150
Near Hempstead	9,789
Along conduit line	3,985

The total cost of this work during the year was $4,880.28.

Mt. Prospect Laboratory.

Collection of Samples.

Daily samples have been taken from the terminus of the aqueduct at both the North and South Side pumping stations at Ridgewood, and from the taps at Flatbush and Seventh avenues and at Flushing and Clermont avenues. These samples have been examined physically and bacteriologically, and once a week microscopically and chemically. Weekly samples have been collected from the distribution reservoirs for complete sanitary analysis, and weekly samples from all the surface supplies have been examined physically and bacteriologically. Partial chemical analyses have been made monthly of all surface supplies, and complete analyses quarterly. Complete analyses have been made monthly of all filtered supplies (mechanical plants, filter beds and infiltration galleries). Samples from most of the driven well stations have such slight fluctuations

in quality that complete analyses are required only quarterly. Monthly, weekly, and, in some cases, more frequent analyses have been made of those ground waters that are high in chlorine and iron.

Analytical Work on Water.

The following figures give the amount of work which has been done for the Borough of Brooklyn at Mt. Prospect and Jameco Laboratories during the year 1906:

Total Samples of Water Analyzed by Laboratories.

Mt Prospect Laboratory	3,811
Jameco	2,828
Total	6,639

Total number of samples analyzed for the Borough of Brooklyn	6,639
Physical examinations	4,628
Complete chemical analyses	393
Partial chemical analyses	1,782
Microscopical examinations	1,191
Bacteriological examinations	5,933
Bacteriological tests for bacillus coli	3,513

General Analytical Work

The following table gives an idea of the general analytical work done during the year:

Cement samples examined	84
Coal samples examined	59
Oil samples examined	40
Sand samples examined	10
Metals and alloys examined	9
Paint supplies examined	8
Alum examined	2
Mineral analyses of water, complete	3
Mineral analyses of water, partial	105
Mineral analyses of cement	2
Special tests and experiments	110

Reports.

Weekly reports have been made giving the quality of the water in the distributing system.

During the year 461 special reports have been made on the quality of the numerous sources of water supply, and on oil, coal and constructional materials used in the Department for the Borough of Brooklyn. The following gives an idea of the increase in special work for Brooklyn for the vear 1906, as compared with the four previous years:

Special Reports—1902, 111; 1903, 135; 1904, 243; 1905, 375; 1906, 461.

Weekly reports have been made on the daily efficiency of the filters at Baiseleys, Springfield, Hempstead and Forest Stream, and periodical reports have been sent on the condition of the water in Hempstead subsiding basin. The quality of the water received from the Queens County Water Supply Company has been reported weekly, and also the quality of the water from the Spring Creek pumping station.

Special tests and studies have been made in relation to the determination of the presence of B. coli in water; of the amount of lime in water; on various sands for filtration purposes; on the removal of algae and intestinal germs from water supplies by the copper sulphate treatment; and on the various methods for the purification of drinking water.

Inspections.

Monthly inspections have been made of the entire Brooklyn watershed, and, with the co-operation of Mr. Brower, Superintendent of Ponds and Reservoirs, a considerable number of nuisances have been abated.

Quality of the Water.

The following table gives a comparison of the average quality of the water for 1905 and 1906, from the two influxes at Ridgewood reservoir and from the taps at Flatbush and Seventh avenues and at Flushing and Clermont avenues:

	Ridgewood Influxes.		Tap Waters.	
	1905.	1906.	1905.	1906.
Physical Examination.				
Turbidity	4.000	4.000	4.000	4.000
Color	14.000	12.000	13.000	10.000
Per cent. of samples with distinct vegetable odors.		0.200	0.100	0.300
Per cent. of samples with odors of decomposition.	0.400	0.300	0.600	1.700
Per cent. of samples with odors due to organisms.			0.700	2.600
Chemical Examination.				
Albuminoid ammonia	0.049	0.033	0.061	0.040
Free ammonia	0.021	0.021	0.012	0.007
Nitrites	0.003	0.003	0.003	0.003
Nitrates	1.060	1.480	1.010	1.480

	Ridgewood Influxes.		Tap Waters.	
	1905.	1906.	1905.	1906.
Total solids	69.000	81.000		
Chlorine	7.290	8.700		..
Hardness	26.000	29.000		
Alkalinity	11.000	15.000	..	...
Iron	0.440	0.530	..	.
Microscopical Examination				
Microscopic organisms	31	51	1,329	520
Amorphous matter	231	280	234	219
Bacteriological Examination.				
Bacteria, per c. c.	363	269	321	186
Per Cent. of Positive Tests for B. Coli—				
In 0.1 c. c.	3.900	3.400	2.200	1.700
In 1 c. c.	17.600	12.400	10.000	6.600
In 10 c. c.	36.300	46.100	27.600	32.700

It will be seen from a comparison of the results in the foregoing table that there is a slight increase in the mineral matter of the water supplied to the Borough of Brooklyn during the year 1906, due to the use of a larger amount of ground water, but in other respects the quality of the water compares favorably with that delivered during the previous year.

Necessity for Covering Distributing Reservoirs.

At certain seasons of the year there developed heavy growths of microscopic organisms, many forms of which cause disagreeable tastes and odors in the supply. The reservoirs at Mt. Prospect and Ridgewood have given an unusual amount of trouble in this connection, due to the fact that a large percentage of water from underground sources is used. Such waters are particularly favorable to the development of these growths.

Diagram No. 3 shows the very small number of microscopic plants and animals in the water flowing into the Ridgewood reservoir and the great increase in the growths due to storage in the sunlight.

If these distributing reservoirs are protected from the sun by suitable covers the microscopic growths and disagreeable tastes and odors which periodically occur in the supply would be entirely eliminated, and the water would be clearer, colder and better in every respect. These covers for distributing reservoirs have been employed for many years both in this country and abroad, and have long proved themselves suc-

cessful in this respect. There is no reason why Brooklyn should be behind other cities in this matter or should further delay this very necessary construction.

Filter Plants.

The operation of the filter plants has been under the efficient direction of Mr. Theodore DeL. Coffin, Inspector of Filters, and the greater part of the following data and tables was compiled by him. Four filter plants are now in operation, two of the gravity mechanical type and two of a modified slow sand type

Hempstead Filter.

This was the first filter built by the Department and was situated just south of the storage reservoir. Hempstead stream formerly fed into this reservoir from the north, but becoming contaminated, a 36-inch by-pass was laid through which the stream could be wasted. This by-passed water is that which the Hempstead beds, completed January, 1904, were designed to treat. The two original beds are of equal size and have a combined area of one acre. At the selected site the surface loam and sand were removed, and on this level bed was laid 6-inch vitrified pipe with open joints and surrounded with gravel. One end of these pipes was closed and the other connected to an 18-inch vitrified pipe, cement jointed, leading to the north end of Hempstead Pond. Embankments 6 feet in height were built about the beds. The raw water connections had gates. Otherwise no provision for the control of rate was made. Later weirs of special design were placed on the ends of the 18-inch collectors so that various rates could be approximated. In these two original beds the sand used had an effective size of 0.27 and a uniformity coefficient of 1.74.

Gaugings in the dry season of 1905 showed that these beds were not able to care for all the waste water, hence the plant was enlarged by the construction of two new beds south of the two already described. Each of the new beds has an area of 0.68 of an acre. The site was leveled, covered with 14 inches of gravel in which were set 4-inch vitrified pipes, open joints, 5 feet centre to centre, connecting with 18-inch vitrified collectors. Over the gravel was placed 2½ feet of sand having an effective size of 0.25 and a uniformity coefficient of 2.12. Embankments 6 feet in height surround the beds. The effluent collectors from the new beds, and from the old as well, are led to suitable weirs controlled by gates, after which the filtered water flows by gravity into the top of the conduit. The necessary pipes and connections are made for cleaning by the Brower process, described under the heading of operation. The capacity of the plant, including the original beds and the two which were finished in November of this year, is 7,000,000 gallons per day.

During the coming year the water of Hempstead stream will first pass through the subsiding basin above the Hempstead storage reservoir before going to the filter beds, so that the preliminary sedimentation which the water will receive will not only

improve the water filtered, but reduce the operating expenses by allowing of longer periods of time between the cleaning of the beds.

Baiseleys and Springfield Filters

In March of 1904, two gravity mechanical filters were put into service—one known as Baiseleys Filter, at the Jameco Station, and having a capacity of 5,000,000 gallons per day when operated at the rate of 128,000,000 gallons per acre per day—the other known as Springfield Filter, at the pumping station of the same name, and having a capacity of 3,000,000 gallons per day.

Sulphate of alumina is used as the coagulant, and at such times as the alkalinity of the applied water is not sufficient to provide the base made necessary by the quantity of the alum employed, soda ash is used to supply this deficiency. Each plant is housed in a frame structure which also contains the necessary chemical solution tanks, sedimentation tanks, air compressors, wash engines and other auxiliaries.

The sand employed at the Springfield plant had an effective size of 0.47 and a uniformity coefficient of 1.77, while at the Baiseleys plant the effective size was 0.46 and the uniformity coefficient was 1.63. The sand at the Baiseleys plant after having been used for some time had distributed itself in the tanks according to the following table:

	Tank No. 3.		Tank No. 8.	
	Effective Size.	Uniformity Coefficient.	Effective Size.	Uniformity Coefficient.
Surface	0.35	1.51	0.38	1.42
Fifteen inches below surface	0.47	1.59	0.45	1.67
Thirty inches below surface	0.50	1.56	0.47	1.59

In January of the present year the finer portion of the sand in the tanks at Baiseleys had to a great extent been washed away from the top over the baffle boards, and it became necessary to replace the portion which had been removed in order to maintain a proper degree of efficiency. At this time a combined sample of the same in the filters showed an effective size of 0.51 and a uniformity coefficient of 1.47. This was thoroughly mixed with 16 per cent. of sand from Forest Stream, having a uniformity coefficient of 0.27 and an effective size of 2.00, and the result was a sand very similar to that originally employed, having, by analysis, an effective size of 0.46 and a coefficient of 1.72.

Forest Stream Filter.

On January 1, 1905, the Forest Stream Filter, at the pumping station of the same name, was put in operation. Here there are two slow sand beds of one acre each.

The construction is similar to that of the new beds at Hempstead except that the laterals are 6 inches, the collectors 24 inches. The sand at this point required washing. The effective size was 0.21 and the uniformity coefficient 2.18 before washing. After being prepared for the beds it had an effective size of 0.27 and a uniformity coefficient of 2.00.

The effluent collectors from each bed, suitably gated, lead to a central well from which the filtered water is pumped directly into the conduit. By varying the pumpage the combined rate may be regulated, and by opening or closing the proper gate the rate of either bed may be increased or diminished as desired. One of the beds is constructed to be cleaned by the Brower method. The capacity of the plant at a maximum is about 5,000,000 gallons per day.

Operation.

The combined total capacity of these filter plants is about 20.000,000 gallons per day, but owing to two particularly dry seasons all of the plants have been operated at a reduced rate during the summer and autumn, especially at Springfield, where in addition to the dry seasons two new pumping stations, drawing from the same area, had so reduced the amount of water coming to the filter that the plant was practically out of service after August 1.

Repairs at Baiseleys have received considerable attention during the year. The air distributing and effluent collecting systems of two units have been thoroughly overhauled, and additional fine sand has been incorporated in every sand bed to replace that removed little by little in the process of washing. Many tank bands have been replaced, and this work is being continued, as practically all the bands are dangerously rusted.

The "Brower" system of removing the accumulation at the surface of the slow sand beds is giving satisfaction. In this method, as developed by Mr. Girdell V. Brower, Superintendent of Ponds and Reservoirs, the beds are divided longitudinally into bays of about 20 feet in width by permanent vertical wooden baffles, extending about one foot above the sand surface. Temporary baffles are placed at the head and foot of all bays but one. By a splendid connection, raw water from an adjoining bed is led into the open channel flowing with a velocity of about ½ foot per second. Men with rakes at the same time disturb the deposited matter which is taken up by the passing water and carried from the bed through a 16-inch pipe provided for that purpose. When the water runs clear, the bay is considered clean. The end baffles from an adjoining bay are removed and placed at the head and foot of the cleaned bay, thus isolating it and opening up a second bay which is treated in the same manner.

The advantages of this method of cleaning are:

1. A great reduction in the cost of cleaning.
2. Economy in the sand, as none is removed from the filter.

3. Cleaning may be done in almost any weather.

4. The time the filter is out of service is reduced to a minimum.

5. The effluent, immediately after starting the cleaned bed, is far better than that resulting from complete removal by scraping.

Table No. 17 attached hereto shows the total amount filtered at each filter plant, as well as the total cost of operation, etc., and the cost of filtration per million gallons.

Experiments.

During the year a series of experiments was made on the sterilizing action of chlorine in water. These results are filed under date of June 23, 1906.

From July 5 to August 20, a series of experiments was carried out at Baiseleys to obtain data upon several points suggested by the Brower system of cleaning.

A comparison of the quantities of sulphate of alumina necessary at Baiseleys and Springfield has been made.

The smaller quantity of chemical required at Springfield to treat a water of given turbidity is due largely to a difference in the color of the water, but is also effected by the fact that the sedimentation of this water previous to the application of the chemical is less than for the Baiseleys water. That is, the particles causing the turbidity at Springfield are coarser.

The most interesting point shown by this comparison is the increased amount of alum, due to decreased temperature of the water during the winter.

While the Fuler Experimentation Filtration was in progress, 400 tests upon the impurities in sand and water were made. These tests were carried on primarily to aid in the intelligent operation of the plants, and are kept in daily record form, as a log of the work accomplished by filtration. In order to gain an idea of the relative efficiencies of the several plants, the records for the year have been brought together, as shown in Table No. 18. This table gives the raw water averaged in the two classes; those carrying more than 2,500 bacteria and those carrying less than 2,500 bacteria per cc., or as "storm waters" and "clear weather waters," for they closely correspond. In this respect the Hempstead water is seen to be the worst, with Baiseleys second. The Hempstead water is supplied without sedimentation and is consequently "flashy." As before stated, connections have been made whereby the settling basin above storage reservoir may be used as a source. This storage will probably effect a great change in the water treated in 1907.

That Baiseleys is the hardest water to successfully filter is shown by the average turbidities. The filtrates from all the filters show a good removal of turbidity.

Effluent bacteria average higher in the mechanical filters than in the slow sand, with any kind of water, but for the period that daily tests for B. coli have been made, the mechanical filters appear to give somewhat better results in this respect.

Infiltration Galleries.

Wantagh.

Water has been pumped from the brick well at these galleries into the conduit continuously day and night, the average pumped per day during the year being 11,500,000.

The work done by the contractors, the New York Continental Jewell Filtration Company, during the year was as follows:

	Pipe Laid.	Manholes Completed.
West leg, linear feet	2,303	4
East leg, linear feet	3,191	8

The pipe laying is now practically completed, but much work of clearing and fixing remains to be done.

Massapequa.

The contractor for the construction of this gallery, Mr. M. J. Dady, has made very good progress during the year. The work done was as follows:

	Linear Feet Laid.	Single Manholes Completed.	Double Manholes Completed.
48-inch discharge main	656		
36-inch suction main	50		
36-inch vitrified (single line)	3,871		
33-inch vitrified (single line)	180		
33-inch vitrified (double line)	2,319		
30-inch vitrified (single line)	937		
27-inch vitrified (single line)	380		
24-inch vitrified (single line)	472		
20-inch vitrified (single line)	528		
Total	9,393	24	9

The contractor started pumping from the pump well into the brick conduit on June 9, and water has been delivered into the conduit continuously since then, the average amount per day obtained from this source since pumping was started being about 10,000,000 gallons.

The installation of the six temporary plants along the line of the Massapequa Gallery was completed by Mr. Dady early in the year, and a continuous supply has been obtained from these plants, amounting to a daily average of 4,000,000 gallons.

Suffolk County Supply.

In order to test, if possible, the Burr Act, it was decided at the beginning of the year to install a pumping station on the section of land within the boundaries of Suffolk County, lying at the easterly end of the strip purchased by the City for the Massapequa Gallery. The work was commenced on February 19, and by working the men as many hours as possible and doing part of the work by requisition, the wells, station, etc., were completed so as to commence delivering water on March 14. The station was operated until May 29, when it was shut down; it was operated again, however, from September 19 to October 27, when it was finally shut down and dismantled. No action has been taken by the Suffolk County authorities in this matter, and it may be necessary to take further steps to force action by them. If they decide to take no action at all, it seems to me that the City should take the necessary steps to endeavor to have the law repealed, as it is imperative that Brooklyn should have further sources of supply in the immediate future, and the only ones at present known to be available lie in Suffolk County.

Contracts.

The following summary shows the contracts which have been prepared and forwarded for approval, printing and advertising and those for which bids have been received, together with the names of the lowest bidders, and the amounts of their bids:

Contracts Prepared and Forwarded for Approval, Printing and Advertising.

(1) For furnishing and delivering cast-iron pipe and special castings.

(2) For hauling and laying water mains and appurtenances.

(3) For furnishing and delivering lubricating and illuminating oils.

(4) For furnishing and delivering semi-bituminous and anthracite coal.

(5) For furnishing, delivering and erecting a temporary boiler plant, with its connections, at the Ridgewood South Side Pumping Station.

(6) For furnishing and delivering stop-cocks.

(7) For setting, replacing and hauling 6-inch hydrant service pipe, fire hydrants and appurtenances, etc.

(8) For removing all ashes from various pumping stations.

(9) For furnishing and driving deep wells.

(10) For architect's services for remodelling and enlarging the Ridgewood North Side Pumping Station.

(11) For operating six or more temporary pumping stations along the line of the Massapequa Infiltration Gallery.

(12) For furnishing unskilled labor for excavating and other miscellaneous work in the Borough of Brooklyn.

(13) For furnishing, delivering and laying water mains and appurtenances in Belmont and Fountain avenues, in Crescent street, etc.

(14) For furnishing and delivering double nozzle hydrants.

(15) For furnishing, constructing and erecting a concrete coal shed and culvert and doing all grading, sodding, etc., at the new Canarsie Pumping Station.

(16) For furnishing, constructing and erecting an engine house for high pressure fire service at Furman and Joralemon streets.

(17) For furnishing, constructing and erecting an engine house for high pressure fire service at Willoughby and St. Edwards streets.

(18) For furnishing and delivering semi-bituminous and anthracite coal.

(19) For furnishing, delivering and laying water mains and appurtenances in Utica, Church and Remsen avenues.

(20) For furnishing, delivering and installing surface condensers, etc., at the Millburn Pumping Station.

(21) For furnishing and erecting a wrought iron fence at the old Ridgewood Pumping Station.

(22) For furnishing and delivering two and four cylinder gasolene automobiles.

(23) For furnishing and delivering 80,100 gross tons of anthracite coal.

(24) For furnishing and delivering cast-iron stop-cock boxes and covers.

(25) For furnishing, delivering and laying a 24-inch water main and appurtenances in Underhill avenue, from Atlantic avenue to the Mt. Prospect Pumping Station.

(26) For furnishing and delivering two temporary boiler plants and two temporary pumping plants.

(27) For furnishing centrifugal pumps and engines.

(28) For unloading, hauling, storing and trimming semi-bituminous coal required for the Millburn Pumping Station.

(29) For regulating, grading and paving the roadway of Force Tube avenue.

(30) For hauling and laying water mains and appurtenances.

(31) For furnishing and delivering cast-iron pipe and special castings.

(32) For furnishing and delivering cast-iron flanged pipe, special castings, etc.

(33) For furnishing and delivering double nozzle hydrants.

(34) For furnishing, delivering, erecting and connecting two boilers and one economizer at the Gravesend Pumping Station.

(35) For furnishing, delivering and laying water mains and removing existing water mains in Flushing, Franklin, Harrison, Marcy, Metropolitan, etc., etc.

(36) For furnishing, delivering and erecting a new pumping plant complete at the Spring Creek Pumping Station.

(37) For unloading, hauling, storing and trimming the coal required for various pumping stations.

(38) For furnishing, constructing and erecting a concrete culvert and doing all grading, sodding, etc., required at the new Gravesend Pumping Station.

(39) For constructing sewer, canal and appurtenances for diverting Beaver Creek around Baiscleys Pond.

(40) For furnishing, constructing and erecting a new pumping station near the Spring Creek Pumping Station.

(41) For sinking shallow wells and driving deep wells.

(42) For furnishing and delivering 20,000 gross tons of semi-bituminous coal.

(43) For furnishing and delivering cast-iron special castings.

(44) For furnishing, delivering and erecting coal weighing scales at various pumping stations.

(45) For removing all ashes for various pumping stations.

Contracts for which bids were received, together with the name of lowest bidder and total amount bid on basis of Engineer's estimate of work to be done:

(1) January 8—For unloading, hauling, storing and trimming the coal required for various pumping stations:

Section 1. Harry Blinn	$7,116 00
Section 2. John B. Reimer	4,736 00
Section 3. Harry Blinn	5,042 80

(2) February 28—For furnishing, delivering and laying water mains and appurtenances in Blake and Fountain avenues:

Isaac Harris	$14,246 50

(3) February 28—For furnishing and delivering lubricating and illuminating oils:

George B. Hewlett	$4,984 00

All bids for this contract were rejected and the contract readvertised.

(4) April 4—For furnishing and delivering stopcocks:

The Fairbanks Company	$8,487 86

(5) April 4—For furnishing and installing grate bars, blowers, etc., at the Ridgewood and Spring Creek Pumping Stations:

The New York Grate Bar Company	$5,775 00

(6) April 4—For furnishing and delivering double-nozzle hydrants:

Herron Pump and Foundry Company..... $29,750 00

(7) April 4—For furnishing, delivering and laying water mains and appurtenances in Fort Hamilton, Gravesend, First, etc.:

Isaac Harris Company..... $240,691 50

(6) April 11—For furnishing, delivering and erecting a temporary boiler plant with its connections at the Ridgewood South Side Pumping Station:

Donegan & Swift..... $6,486 00

(9) May 2—For furnishing, constructing and erecting the Canarsie Pumping Station:

Richard Whalen & Co..... $23,781 00

(10) May 2—For furnishing, delivering and erecting three boilers at the new Canarsie Pumping Station:

B. Franklin Hart, Jr., & Co..... $18,315 00

(11) May 2—For furnishing, delivering and erecting the necessary steam-fitting and appurtenances at the new Canarsie Pumping Station:

Blake & Williams $4,565 00

(12) May 2—For furnishing, delivering, erecting and connecting two pumping engines, including foundations, etc., at the proposed Canarsie Pumping Station:

Marine Engine and Machine Company..... $38,850 00

(13) May 2—For furnishing and delivering cast-iron pipe and special castings:

Warren Foundry and Machine Company..... $143,740 00

(14) May 2—For hauling and laying water mains and appurtenances:

Isaac Harris Company..... $42,455 00

(15) May 2—For furnishing and delivering lubricating and illuminating oils and lubricating grease:

William E. Burke..... $6,240 00

(16) May 4—For furnishing and delivering semi-bituminous and anthracite coal:

Section 1. George D. Harris & Co.	$12,600 00
Section 2. George D. Harris & Co.	15,750 00
Section 3. N. L. Stokes.	36,900 00
Section 4. Howard S. Downs.	30,310 00

(17) May 9—For furnishing and delivering double-nozzle hydrants:

Herron Pump and Foundry Company.	$30,200 00

(18) May 23—For furnishing, delivering and laying a 72-inch rivetted steel pipe line from Brooklyn to Valley Stream:

The T. A. Gillespie Company.	$1,143,105 00

(19) May 24—For furnishing and delivering semi-bituminous and anthracite coal:

Section 1. George D. Harris & Co.	$54,800 00
Section 2. George D. Harris & Co	209,532 00

(20) June 13—For removing all ashes from various pumping stations:

Bedford Construction Company.	$10 75

(21) July 3—For furnishing and delivering 80,100 gross tons of anthracite coal:

Howard Bowns	$237,569 00

(22) July 25—For furnishing, delivering, erecting and connecting a pumping plant in the remodeled Ridgewood North Side Station:

Davis & Farnum Manufacturing Company.	$340,000 00

(23) July 25—For furnishing, delivering and installing superheaters and piping at various pumping stations:

Power Specialty Company.	$11,780 00

Above bid was rejected.

(24) July 25—For furnishing and delivering stopcocks:

Rensselaer Manufacturing Company.	$35,375 00

(25) July 25—For setting, replacing and hauling 6-inch hydrant service pipe, fire hydrants and appurtenances:

Isaac Harris Company.	$38,028 50

(26) July 25—For furnishing and driving deep wells:

Section 1. George W. Phillips	$21,642 40
Section 2. George W. Phillips	25 086 30
Section 3. George W. Phillips	17,692 85

(27) July 25—For furnishing, delivering and laying water mains and appurtenances in Belmont and Fountain avenues, etc.:

James P. Graham	$13,860 25

(28) August 15—For furnishing, constructing and erecting an engine house for high pressure fire service at Furman and Joralemon streets:

Charles H. Peckworth	$64,422 00

(29) August 15—For furnishing, constructing and erecting an engine house for high pressure fire service at Willoughby and St. Edwards streets:

Charles H. Peckworth	$45,423 00

(30) August 15—For furnishing, delivering and laying water mains and appurtenances in Utica, Church and Remsen avenues:

Hammond & Sloane (Inc.)	$54,395 00

(31) August 29—For furnishing, constructing and erecting a concrete coalshed and culvert and doing all grading, sodding, etc., at the new Canarsie Pumping Station:

Newman Construction Company	$37 400 00

(32) August 29—For furnishing and erecting a wrought-iron fence with gates at the old Ridgewood Pumping Station:

John Fox & Co	$6,966 00
Leslie McHarg & Co	6,966 00

(33) September 19—For furnishing and delivering cast-iron stopcock boxes and covers:

Sections 1 and 2—

Herron Pump and Foundry Company	$15,840 00
W. P. Taylor Company	15,840 00
Hammond & Sloane Company (Inc.)	15,840 00

All bids for above contract were rejected and the contract readvertised.

(34) September 19—For unloading, hauling, storing and trimming semi-bituminous coal required for the Millburn Pumping Station:

Harry Blinn $2,650 00

(35) September 19—For furnishing and delivering cast-iron pipe and special castings:

U. S. Cast Iron Pipe and Foundry Company..... $68,375 00

(36) September 26—For furnishing, constructing and erecting a machine shop and office at old Ridgwood Pumping Station:

Charles H. Peckworth..... $37,844 00

(37) October 10—For furnishing and delivering cast-iron stopcock boxes and covers:

Sections 1 and 2. Herron Pump and Foundry Company..... $15,037 44

(38) October 10—For furnishing, delivering and laying a 24-inch water main and appurtenances in Underhill avenue, from Atlantic avenue to the Mount Prospect Pumping Station:

Hammond & Sloane (Inc.)..... $21,576 40

(39) October 10—For furnishing and delivering cast-iron flanged pipe, special castings, etc.:

John Fox & Co..... $4,193 00

(40) October 10—For furnishing and delivering double-nozzle hydrants:

Herron Pump and Foundry Company..... $32,480 00

(41) October 24—For furnishing, delivering and installing surface condensers, etc., at the Millburn Pumping Station:

M. T. Davidson..... $8,950 00

(42) October 31—For furnishing, delivering, erecting and connecting two boilers and one economizer at the new Gravesend Pumping Station:

Thomas F. Purcell..... $11,700 00

(43) November 7—For furnishing, constructing and remodelling the Ridgewood North Side Pumping Station:

Michael J. Dady	$261,000 00

All the bids for the above contract were rejected.

(44) December 26—For unloading, hauling, storing and trimming the coal required for various pumping stations:

Section 1. Augustus Munz	$2,617 00
Section 2. John Sutter	2,220 00
Section 3. Harry Blinn	4,380 00

(45) December 26—For furnishing, delivering and erecting eight water tube boilers in the remodeled Ridgewood North Side Pumping Station:

Heine Safety Boiler Company	$33,840 00

(46) December 28—For hauling and laying water mains and appurtenances in the Borough of Brooklyn:

Charles Cranford	$52,588 50

Tables and Diagrams.

The tables and diagrams attached are as follows:

Table No. 1. Showing monthly record of rainfall at Brooklyn and vicinity, from 1897 to 1907.

Table No. 2. Showing monthly record of rainfall at Hempstead Storage Reservoir from 1897 to 1907.

Table No. 3. Showing daily record of rainfall at Brooklyn and vicinity during 1906.

Table No. 4. Showing daily record of rainfall at Hempstead Storage Reservoir during 1906.

Table No. 5. Showing highest and lowest monthly range and average temperatures (degrees Fahrenheit) for ten years, between 8 and 9 a. m., at Hempstead Storage Reservoir.

Table No. 6. Showing average daily consumption of water in Brooklyn for each month during 1906.

Table No. 7. Showing average daily consumption of water in Brooklyn from 1897 to 1907.

Table No. 8. Showing average maximum and minimum daily consumption of water during 1906.

Table No. 9. Showing ratio of the average daily consumption for each month to that for the years from 1897 to 1907.

Table No. 10. Showing average depth and corresponding quantity of water in Ridgewood, Mt. Prospect, New Lots and Hempstead Storage Reservoirs.

Table No. 11. Showing the total monthly and average daily pumping at Ridgewood for the year 1906, rainfall for each month and proportion of the rainfall corresponding to the pumping.

Table No. 12. Showing the amount of water delivered at the Ridgewood Pumping Station from each source during 1906.

Table No. 13. Showing water mains laid and removed and gates and hydrants set and removed to December 31, 1906.

Table No. 14. Showing high pressure fire service mains laid and gates and hydrants set to December 31, 1906.

Table No. 15. Showing water mains laid and gates and hydrants set during the year 1906.

Table No. 16. Showing high pressure fire service mains laid and gates and hydrants set during the year 1906.

Table No. 17. Showing net amount of water filtered at the Baisley's and Springfield filter plants and at the Forest Stream and Hempstead filter beds, and cost of filtration per million gallons during 1906.

Table No. 18. Showing character of raw and filtered water at Baisley's and Springfield filter plants and at Forest Stream and Hempstead filter beds.

Table No. 19. Showing average quality of the water from the two Ridgewood reservoirs during 1905 and 1906.

Table No. 20. Showing average quality of the water from the tap at the laboratory from Flushing and Clermont avenues and from Flatbush avenue during 1905 and 1906.

Table No. 21. Showing results of tests of high pressure fire service mains during 1906.

Diagram No. 1. Showing contents of reservoirs, consumption, rainfall and temperature from 1897 to 1907.

Diagram No. 2. Showing the quality of the Brooklyn water supply, tap at Flatbush avenue.

Diagram No. 3. Showing the number of microscopic organisms before and after storage in the distribution reservoirs of the Brooklyn water supply, from 1897 to December, 1906.

Office Room.

By securing five additional rooms on the west side of the building, formerly occupied by the Sewer Bureau, we were enabled to provide somewhat more adequate room for the Assistant Engineers and the clerical staff, but the available space is still

insufficient to properly and economically carry out the work of the Bureau, which is constantly increasing. Additional space, therefore, should be allotted to this Bureau.

Office Force.

The extraordinary amount of contract work being done by this Bureau, together with the regular routine work of the office, requires a much larger force than is at present employed to adequately supervise the work and properly keep the records of same, as well as to prepare contracts for the new work which is needed to improve and increase the supply and extend the distribution system. It is, therefore, imperative that an additional force be assigned to this Bureau if it is expected to properly plan and carry out the new work, as well as to look after the work on hand.

The present force of this Bureau have generally shown keen interest in performing their duties and unusual zeal in carrying forward the plans prepared by the Department. The compensation received by the members of the engineering corps is utterly inadequate to their services and responsibilities, and it is imperative that their compensation be increased if we are not to lose their services.

Yours respectfully,

J. W. McKAY, Acting Chief Engineer

TABLE No. 1.

Monthly Record of Rainfall at Brooklyn and Vicinity from 1897 to 1907.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1897*.....	3.16	2.67	2.53	3.10	6.04	2.68	10.00	3.37	1.55	0.94	4.88	4.64	45.56
1898*.....	3.96	4.73	2.98	3.24	6.03	1.57	4.82	3.41	2.02	5.75	6.52	2.93	47.96
1899*.....	3.73	3.74	6.13	1.65	1.14	2.34	7.08	4.48	6.13	2.07	1.64	1.98	42.11
1900*.....	4.00	5.33	3.74	1.88	4.66	3.07	5.14	2.33	3.05	3.42	4.58	1.91	43.11
1901*.....	2.16	0.55	4.22	6.33	7.03	0.99	7.16	6.27	2.16	3.03	1.18	6.90	47.98
1902*.....	2.50	6.02	4.31	3.39	1.20	5.87	2.69	3.68	4.19	6.49	1.69	6.44	48.47
1903*.....	3.64	3.84	4.18	3.19	0.44	8.76	3.46	6.36	2.77	12.02	1.07	2.76	52.49
1904*.....	3.20	2.19	3.54	4.74	2.01	2.61	5.40	8.76	3.36	3.54	2.47	2.59	44.41
1905*.....	3.24	2.64	3.85	2.61	0.83	4.92	3.97	5.40	7.17	2.61	1.69	3.49	42.42
1906*.....	2.82	2.23	5.41	5.60	5.29	1.91	3.93	3.32	3.08	5.77	1.32	4.11	44.79

* Record taken at Municipal Building, Brooklyn.

TABLE No. 2.

Monthly Record of Rainfall at Hempstead Storage Reservoir from 1897 to 1907.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1897.....	2.27	2.74	3.11	3.33	4.64	3.17	11.68	2.62	1.51	1.51	5.00	4.83	46.41
1898.....	4.12	3.23	3.45	3.39	8.99	0.77	5.43	4.83	2.44	5.81	6.00	2.36	51.22
1899.....	4.22	5.02	7.79	1.47	1.79	2.21	5.07	3.59	5.17	2.76	2.69	1.82	43.60
1900.....	4.45	5.04	3.77	1.87	4.11	1.98	4.69	3.76	2.10	3.22	4.16	2.28	41.43
1901.....	2.21	0.77	6.97	8.05	7.17	0.55	5.93	4.03	3.36	1.95	1.28	7.65	49.92
1902.....	2.17	4.99	5.01	3.62	1.01	6.03	2.42	3.34	5.54	8.68	2.13	7.04	51.98
1903.....	3.82	4.65	5.21	3.98	0.40	9.58	3.16	7.67	2.05	6.65	1.54	3.43	52.14
1904.....	2.97	3.56	3.58	4.24	2.44	3.77	5.03	10.76	4.58	3.38	1.87	2.44	48.62
1905.....	2.20	3.00	4.05	3.18	1.07	3.41	2.33	4.54	4.51	2.86	1.81	3.86	36.82
1906.....	4.29	1.95	4.98	4.56	3.41	4.26	5.60	2.54	1.45	5.97	1.46	3.65	44.12

TABLE No. 3.

Daily Record of Rainfall, Brooklyn and Vicinity, During 1906.

Day.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1.....	..	..	..	..	..	..	.32	..	..	..	..	..	.32
2.....	..	..	..	..	.05	..	..	1.04	..	.02	..	..	1.11
3.....	1.99	..	2.08	..	..	..	.47	.17	.10	..	..	.05	3.87
4.....	.63	..	.47	..	..	..	1.21	.08	..	..	..	..	2.39
5.....	..	..	..	.05	.09	..	..	..	..	.34	..	..	.48
6.....	..	..	..	.04	.03	.27	..	..	..	.03	..	.32	.69
7.....	..	..	.02	..	.25	..	..	1.13	..	..	..	..	1.40
8.....	.15	.17	..	..	..	..	.02	.02	..	..	..	..	.36
9.....	.02	.97	..	2.05	.32	..	.13	..	..	1.30	..	..	4.79
10.....	..	..	..	.45	..	.03	.21	..	..	.10	..	.75	1.54
11.....	..	..	..	.07	.13	..	..	.43	..	..	.52	.04	1.19
12.....	.10	..	.02	..	..	..	..	..	1.58	..	.03	..	1.73
13.....	..	..	.01	..	..	..	..	..	.70	..	..	..	.71
14.....	.61	.10	.06	..	.30	..	..	..	..	..	..	..	1.07
15.....	.07	.02	1.29	1.48	..	..	.01	..	..	..	.51	.04	3.42
16.....	..	..	..	..	..	.02	.10	..	..	..	.01	.16	.29
17.....	..	..	..	..	..	.62	.61	..	..	..	..	.51	1.74

Day.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
18	.02	..	..	..	.15	.05	..	..	..	..	.17	.01	.40
19	..	..	1.16	..	..	.28	..	.11	.01	.03	..	..	1.59
20	..	..	..	..	..	..	..	.06	.03	2.19	.04	.87	3.19
21	..	.50	..	.08	..	..	.60	.13	.02	.98	.04	..	2.35
22	..	..	..	..	..	..	..	..	.34	..	..	.04	.38
23	.12	..	..	1.26	..	.05	..	.04	..	..	..	..	1.47
24	.05	..	..	..	..	..	..	..	..	.02	..	..	.07
25	..	.47	..	..	..	..	..	.06	..	.48	..	..	1.01
26	..	..	.06	..	..	..	..	..	..	..	..	..	.06
27	..	..	.07	..	2.95	..	..	.04	.21	..	..	..	3.27
28	.05	..	..	..	.79	..	.12	..	..	..	..	..	.96
29	..	..	..	..	.20	.49	.13	.01	..	..	..	..	.83
30	..	..	.06	.12	.02	.10	..	..	.09	..	..	.26	.55
31	..	..	.11	..	.01	..	..	..	..	.28	..	1.06	1.56
Total	2.83	2.23	5.41	5.60	5.29	1.91	3.93	3.32	3.08	5.77	1.32	4.11	44.79

TABLE No. 4.

Daily Record of Rainfall at Hempstead Storage Reservoir During 1906.

Day.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1	..	..	..	..	..	..	..	.04	..	..	..	..	.04
2	..	..	..	..	..	.01	..	.17	..	.04	..	..	.22
3	..	..	..	..	.08	..	..	.75	.08	..	..	.11	1.02
4	1.60	..	2.37	..	..	..	3.42	.27	..	..	..	..	7.66
5	..	..	..	..	..	..	..	..	..	.06	..	..	.06
6	..	..	..	.06	..	..	..	..	..	.05	..	.06	.17
7	..	..	..	..	.45	..	.02	..	..	..	..	.14	.61
8	.03	..	.03	.09	..	..	..	.13	..	..	..	..	.28
9	.04	.96	..	.33	..	..	.04	..	..	.10	..	..	1.47
10	..	..	..	1.73	.12	.02	.07	..	..	.51	..	.09	2.54
11	..	..	..	.21	..	.07	.38	..	..	..	.53	.62	1.81
12	.03	..	.04	..	.16	..	..	.04	..	..	.05	..	.32

Day.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
13.	..	.05	..	..	..	..	..	..	.66	..	..	..	.71
14.	1.85	..	.05	..	.32	..	..	..	.05	..	..	..	2.27
15.	..	..	.14	.53	..	..	..	..	..	..	.43	.05	1.15
16.	.33	..	.66	..	..	1.40	.06	..	..	..	.08	..	2.53
17.	..	..	..	..	..	.59	.02	..	..	..	..	.33	.94
18.	.07	..	..	..	.24	1.03	.17	..	..	..	..	.40	1.91
19.	..	..	..	..	..	.03	..	..	..	..	.25	..	.28
20.	..	..	1.33	..	..	.04	..	..	..	1.74	.10	.08	3.29
21.	..	..	..	.04	..	..	.70	.06	.04	2.18	..	.48	3.50
22.	..	.65	..	..	..	.03	.02	.29	..	.02	.02	..	1.03
23.	.23	..	..	1.09	..	.06	.19	..	.34	..	..	.11	2.02
24.	..	..	..	.25	..	.07	.30	.09	..	..	..	..	.71
25.	..	.06	..	..	..	..	..	.20	..	.90	..	..	1.16
26.	..	.23	..	..	..	..	..	..	..	..	..	..	.23
27.	..	..	.05	..	..	.36	..	.06	.05	..	..	..	.52
28.	.11	.	.06	..	.82	..	.02	.35	.14	..	..	.02	1.52
29.	..	..	..	..	1.19	.21	.07	.09	..	..	..	..	1.56
30.	.	.	..	.23	..	.34	.10	..	.09	..	..	..	.76
31.	..	..	.25	..	.03	..	.02	..	..	.37	..	1.16	1.83
Total.	4.29	1.95	4.98	4.56	3.41	4.26	5.60	2.54	1.45	5.97	1.46	3.65	44.12

TABLE No. 5.

Highest, Lowest, Monthly Range of and Average Temperatures (Degrees Fahrenheit) for Ten Years, Between 8 and 9 o'clock A. M., at Hempstead Storage Reservoir.

	January.				February.				March.				April.				May.				June.				July.			
	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.
1897	44	8	36	25	40	8	32	27	49	19	30	35	58	28	30	45	68	48	20	56	72	52	20	62	76	62	14	70
1898	49	2	47	29	42	4	38	28	55	26	29	40	56	30	26	45	68	44	24	56	75	57	18	67	80	60	20	72
1899	47	3	44	26	42	5	47	23	47	24	23	36	63	32	31	46	72	52	20	59	85	63	22	70	80	65	15	71
1900	54	12	42	29	51	5	46	27	45	16	29	31	60	30	30	47	72	43	29	58	80	59	21	69	85	61	24	74
1901	49	5	35	29	35	11	24	21	52	12	40	35	54	39	15	46	70	40	30	57	87	55	32	70	94	64	30	75
1902	41	14	27	25	44	11	33	25	52	25	27	40	60	38	22	48	70	45	25	59	76	62	14	67	81	62	19	71
1903	48	10	38	27	49	2	47	28	52	29	23	43	64	32	32	49	75	45	30	60	74	56	18	63	84	65	19	74
1904	45	—6	51	19	42	..	42	18	49	17	32	34	55	28	27	44	72	52	20	61	84	55	29	68	80	66	14	72
1905	46	..	46	23	34	2	32	20	48	16	32	34	59	36	23	45	68	44	24	58	78	51	27	66	85	58	27	74
1906	50	4	46	33	40	6	34	26	45	16	29	31	57	35	22	47	80	46	34	60	80	57	23	68	79	66	13	71
	46	5	41	26	42	4	38	24	49	20	29	36	59	33	26	46	72	46	26	58	79	57	22	67	82	63	19	72

	August.				September.				October.				November.				December.				For Year.			
	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.
1897	75	61	14	68	75	45	30	61	66	32	34	50	60	21	39	41	49	10	39	31	76	8	68	48
1898	79	63	16	71	78	53	25	65	71	40	31	55	56	23	33	39	48	8	40	31	80	2	78	50
1899	77	63	14	69	73	48	25	63	67	38	29	55	62	25	37	41	56	8	48	33	85	—5	90	49
1900	84	65	19	74	79	52	27	68	69	42	27	57	65	22	43	45	46	12	34	30	85	5	80	51
1901	78	67	11	73	77	55	22	66	66	43	23	54	55	20	35	37	53	10	43	31	94	5	89	50
1902	77	64	13	71	73	53	20	65	66	40	26	50	60	30	30	48	48	8	40	29	81	8	73	58
1903	77	60	17	68	74	44	30	62	68	42	26	54	52	16	36	36	48	10	38	26	84	6	78	50
1904	76	60	16	70	74	44	30	63	67	33	34	51	46	20	26	37	45	9	36	25	84	—6	90	47
1905	78	60	18	69	70	49	21	63	69	38	31	52	54	21	33	37	54	16	38	32	85	..	85	48
1906	80	64	16	74	78	53	25	67	66	41	25	53	57	28	29	40	48	9	39	29	80	4	76	50
	78	63	15	71	75	50	25	64	67	39	28	54	57	23	34	40	49	10	39	30	83	3	80	50

TABLE No. 6.

Summary of Average Daily Consumption of Water in Brooklyn for Each Month During 1906.

Month.	Ridgewood and Mt. Prospect Low Services.	Mt. Prospect High Service.	Gravesend.	New Utrecht.	New Lots.	Total.
January	107,959,775	4,549,290	2,947,065	2,007,516	4,153,644	121,617,291
February	114,337,893	5,018,464	2,989,643	1,965,964	4,340,215	128,652,179
March	110,798,838	6,070,323	2,928,645	1,843,097	4,314,419	126,056,322
April	112,059,300	5,233,567	2,903,267	1,801,067	4,265,100	126,262,301
May	114,770,613	5,427,742	3,230,548	1,786,097	4,272,194	129,487,194
June	119,687,800	5,163,333	3,419,367	1,817,433	4,223,300	134,311,233
July	111,422,161	5,161,452	3,173,581	1,722,935	4,817,903	126,298,032
August	114,026,194	5,315,903	3,274,613	1,616,323	5,699,742	130,032,775
September	116,641,033	5,327,567	3,245,933	1,578,667	6,197,333	132,990,533
October	108,537,742	5,422,806	3,382,516	1,028,903	6,291,839	124,663,806
November	102,503,134	5,499,633	93,360	45,506	6,595,400	119,260,367
December	108,722,035	5,493,226	3,216,030	1,493,774	6,561,290	125,491,355
Average for year	112,140,822	5,306,942	2,914,545	1,559,440	5,146,865	127,068,614

TABLE

Average Daily Consumption of Water

Month.	1897.	1898.	1899.	1900.
January	88,508,491	92,738,576	96,502,152	92,021,990
February	87,524,651	93,636,874	102,822,950	93,875,485
March	86,648,501	90,732,567	95,112,986	94,378,811
April	87,657,203	89,665,471	94,003,531	91,877,708
May	87,198,335	90,734,731	96,835,982	96,114,581
June	90,882,138	96,653,019	99,850,034	99,542,241
July	92,439,865	95,367,904	97,763,355	99,681,945
August	92,686,144	96,547,558	97,172,481	98,384,748
September	96,139,765	98,934,202	96,574,665	94,894,169
October	93,863,740	94,201,585	93,787,252	88,790,469
November	89,749,903	90,269,822	90,549,242	87,047,378
December	89,353,350	93,324,553	89,959,154	93,809,556
Average	90,233,457	93,563,231	95,863,571	95,605,721

No. 7.

from 1897 to 1907, United States Gallons.

1901.	1902.	1903.	1904.	1905.	1906.
97,331,371	101,891,184	107,828,904	116,463,845	123,237,196	121,617,291
93,739,375	103,879,545	108,589,023	128,156,893	129,515,942	128,652,179
92,016,696	99,806,437	105,100,729	114,487,613	123,601,713	126,056,322
93,721,383	99,847,690	103,025,471	106,631,005	117,849,604	126,262,301
95,057,314	101,170,927	104,753,479	106,506,897	121,477,761	129,487,194
101,784,528	102,174,855	100,690,550	109,029,548	120,343,060	134,311,233
101,202,273	99,747,124	105,159,017	108,448,827	118,341,819	126,298,032
97,249,230	97,719,661	102,009,011	110,330,125	114,714,786	130,032,775
97,011,649	100,325,147	108,114,334	113,196,405	113,991,247	132,990,533
97,687,658	98,984,798	103,691,807	112,678,795	115,322,139	124,663,806
95,447,760	96,363,843	99,617,300	112,930,626	114,029,144	119,260,367
98,124,421	102,019,521	108,518,204	119,548,389	119,053,325	125,491,355
96,720,603	100,305,485	104,747,447	113,149,117	119,234,968	127,068,614

Number of taps in use, January 1, 1907, 136,056.

Gravesend system acquired in 1895; pumping about 2,000,000 United States gallons per day.

New Utrecht system acquired in 1895; pumping about 1,000,0000 United States gallons per day.

New Lots system acquired in 1900; pumping about 3,500,000 United States gallons per day.

TABLE No. 8.

Showing Average, Maximum and Minimum Daily Consumption of Water, 1906.

1906.	Average, U. S. Gallons.	Maximum.		Minimum.	
		Date.	U. S. Gallons.	Date.	U. S. Gallons.
January.....	121,617,291	Monday, 29th.....	125,604,000	Sunday, 21st..	112,400,000
February.....	128,632,179	Wednesday, 28th....	137,144,000	Sunday, 25th..	117,899,000
March.....	126,056,322	Friday, 23d.....	137,534,000	Sunday, 11th..	117,111,000
April.....	126,262,301	Wednesday, 18th..	134,841,000	Sunday, 15th..	112,380,000
May.....	129,487,194	Friday, 25th.....	135,903,000	Sunday, 6th...	118,416,000
June.....	134,311,233	Friday, 29th.....	142,445,000	Sunday, 17th..	121,265,000
July.....	126,298,032	Monday, 2d.....	135,533,000	Sunday, 8th...	114,594,000
August.....	130,032,775	Monday, 6th.....	140,555,000	Sunday, 26th..	115,463,000
September....	132,990,533	Monday, 10th.....	143,097,000	Sunday, 2d....	114,985,000
October.....	124,663,806	Monday, 1st.....	133,411,000	Sunday, 21st..	111,346,000
November.....	119,260,367	Tuesday. 20th.....	125,177,000	Sunday, 11th..	108,882,000
December.....	125,491,355	Friday, 7th.....	137,322,000	Sunday, 2d....	110,394,000
Average.....	127,068,614				

TABLE No. 9.

Showing Ratio of the Average Daily Consumption for Each Month to That for the Years from 1897 to 1907.

Month.	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
January	0.98	0.99	1.01	0.96	1.01	1.02	1.03	1.03	1.03	0.96
February	0.97	1.00	1.07	0.98	0.97	1.04	1.04	1.13	1.09	1.01
March	0.96	0.97	0.99	0.99	0.95	1.00	1.00	1.01	1.04	0.99
April	0.97	0.96	0.98	0.96	0.97	1.00	0.99	0.94	0.99	0.99
May	0.97	0.97	1.01	1.01	0.98	1.01	1.00	0.94	1.02	1.02
June	1.01	1.03	1.04	1.04	1.05	1.02	0.96	0.96	1.01	1.05
July	1.03	1.02	1.02	1.04	1.05	0.99	1.00	0.96	0.99	0.99
August	1.03	1.03	1.01	1.03	1.01	0.97	0.98	0.98	0.96	1.02
September	1.07	1.06	1.01	0.99	1.00	1.00	1.03	1.00	0.96	1.04
October	1.04	1.01	0.98	0.93	1.01	0.99	0.99	1.00	0.97	0.98
November	0.99	0.97	0.94	0.91	0.99	0.96	0.95	1.00	0.96	0.94
December	1.03	0.99	0.94	0.98	1.01	1.02	1.04	1.06	1.00	1.03

TABLE

Average Depth and Corresponding Quantity of Water in Ridgewood,

1906.	Ridgewood Reservoirs. Basin No. 1. Average Depth, Feet.	Basin No. 1. Contents, United States Gallons.	Basin No. 2. Average Depth, Feet.	Basin No. 2. Contens, United States Gallons.	Basin No. 3. Average Depth, Feet.	Basin No. 3. Contents, United States Gallons.
January	17.55	61,487,000	17.41	70,884,000	16.97	125,495,000
February	15.51	53,865,000	15.37	62,030,000	15.25	112,120,000
March	17.83	62,543,000	17.76	72,417,000	17.01	125,808,000
April	20.13	71,308,000	19.80	81,442,000	17.17	127,060,000
May	19.32	68,203,000	18.83	77,133,000	16.87	124,714,000
June	17.97	63,072,000	17.81	72,637,000	15.23	111,965,000
July	18.49	65,042,000	18.32	74,880,000	13.96	102,186,000
August	18.59	65,421,000	17.95	73,252,000	16.62	122,762,000
September	19.53	69,006,000	19.27	79,083,000	18.03	133,812,000
October	20.62	73,196,000	20.33	83,811,000	19.49	145,358,000
November	20.07	71,077,000	19.75	81,219,000	18.81	139,967,000
December	17.75	62,242,000	14.19	56,976,000	16.34	120,579,000
Average	18.61	65,497,000	18.07	73,779,000	16.81	124,245,000

No. 10.

Mt. Prospect, New Lots and Hempstead Storage Reservoirs.

Mt. Prospect Reservoir.		New Lots Reservoir.		Hempstead Storage Reservoir.		Total, all Reservoirs.
Average Depth, Feet.	Contents, United States Gallons	Average Depth, Feet.	Contents, United States Gallons.	Average Depth, Feet.	Contents, United States Gallons.	Contents, United States Gallons.
19.24	18,342,000	13.41	3,515,000	6.82	116,676,000	396,399,000
20.49	19,732,000	9.63	*2,204,000	11.08	305,279,000	555,230,000
20.59	19,844,000			12.92	414,516,000	695,128,000
20.01	19,196,000			14.75	533,654,000	832,660,000
19.19	18,287,000			15.83	608,062,000	896,399,000
19.77	18,929,000			16.27	637,371,000	903,974,000
20.56	19,810,000			16.38	646,257,000	908,175,000
20.01	19,196,000			15.66	596,488,000	877,119,000
19.50	18,629,000			12.71	401,505,000	702,035,000
19.51	18,640,000			9.50	223,752,000	544,757,000
19.43	18,552,000			11.36	319,491,000	630,306,000
19.45	18,574,000			11.44	324,269,000	582,640,000
19.81	18,973,000	11.52	2,870,000	12.89	411,903,000	697,267,000

*New Lots Reservoir was emptied and abandoned in February, 1906.

TABLE

Showing the Total Monthly and Average Daily Pumping at Ridgewood for the Year

Pum

Month.	Pumping United States Gallons.				Drainage Area. Square Miles.			*Rainfall During Month in Inches.
	Furnished by		Total.	Average Daily.	Old Watershed.	New Watershed.	Total, Watershed.	
	Old Watershed.	New Watershed.						
January...	1,588,828,000	1,903,753,000	3,492,581,000	112,663,903	67.4	90.2	157.6	4.29
February..	1,529,971,000	1,770,042,000	3,300,013,000	117,857,607				1.95
March....	1,645,653,000	2,064,491,000	3,710,144,000	119,682,065				4.98
April.....	1,628,287,000	1,880,415,000	3,508,702,000	116,956,733				4.56
May.....	1,797,979,000	1,894,631,000	3,692,610,000	119,116,451				3.41
June.....	1,953,288,000	1,744,213,000	3,697,501,000	123,250,033				4.26
July.....	1,786,581,000	1,907,770,000	3,694,351,000	119,172,613				5.60
August...	1,971,753,000	1,717,523,000	3,689,276,000	119,008,903				2.54
September	2,123,105,000	1,559,432,000	3,682,537,000	112,751,233				1.45
October....	1,809,447,000	1,719,089,000	3,528,536,000	113,823,742				5.97
November.	1,481,433,000	1,745,251,000	3,226,684,000	107,556,133				1.46
December.	1,807,519,000	1,687,498,000	3,495,017,000	112,742,484				3.65
Summary for the year...	21,123,844,000	21,594,108,000	42,717,952,000	117,035,485	67.4	90.2	157.6	44.12

* Rainfall observed at Hempstead Storage Reservoir.

TABLE

Record Showing the Amount of Water Delivered at the Ridge

Source of Supply.	Underground Water.			
	Driven Wells.		Infiltration Galleries.	
	Total for Year.	Average Daily.	Total for Year.	Average Daily.
Old Water Shed.				
Spring Creek (driven well station).....	2,166,234,000	5,934,888		
Aqueduct (driven well station).....	1,178,106,000	3,227,688		
Oconee (driven well station).....	1,134,069,000	3,107,038		
Baiseleys (driven well station).....	574,131,000	1,572,961		
Baiseleys Filter Plant (Baiseleys Pond).....				

No. 11.

1906; Rainfall for Each Month and Proportion of the Rainfall Corresponding to the ping.

Water Pumped, Expressed in Rainfall in Watershed.						Average Yield Utilized Per Square Mile of Watershed.					
Old.		New.		Total.		United States Gallons Daily.			Cubic Feet Per Second.		
Inches.	Per Cent.	Inches.	Per Cent.	Inches.	Per Cent.	Old.	New.	Total.	Old.	New.	Total.
1.36	31.70	1.21	28.21	1.28	29.84	760,423	680,836	714,872	1.18	1.05	1.11
1.31	67.18	1.13	57.95	1.20	61.54	810,710	700,840	747,827	1.25	1.08	1.16
1.41	28.31	1.32	26.51	1.35	27.11	787,620	738,320	759,404	1.22	1.14	1.17
1.39	30.48	1.20	26.32	1.28	28.07	805,285	694,906	742,111	1.25	1.08	1.15
1.53	44.87	1.21	35.48	1.35	39.59	860,524	677,574	755,815	1.33	1.05	1.17
1.67	39.20	1.11	26.06	1.35	31.69	966,018	644,572	782,043	1.49	1.00	1.21
1.53	27.32	1.22	21.79	1.35	24.11	855,069	682,272	756,172	1.32	1.06	1.17
1.68	66.14	1.10	43.31	1.35	53.15	943,693	614,235	755,133	1.46	0.95	1.17
1.81	124.83	0.99	68.28	1.35	93.10	1,050,003	576,287	778,878	1.62	0.89	1.21
1.54	25.80	1.10	18.43	1.29	21.61	866,013	614,795	722,232	1.34	0.95	1.12
1.26	86.30	1.11	76.03	1.18	80.82	732,657	644,956	682,463	1.13	1.00	1.06
1.54	42.19	1.08	29.59	1.28	35.07	865,090	603,497	715,371	1.34	0.93	1.11
18.03	40.87	13.78	31.23	15.61	35.38	858,658	655,897	742,611	1.33	1.01	1.15

No. 12.

wood Pumping Station from Each Source During 1906.

Surface Water.						Total U. S. Gallons Delivered During Year.	Average U. S. Gallons Delivered Per Day.
Pond Pumping.		Filter Plants.		Gravity.			
Total for Year.	Average Daily.	Total for Year.	Average Daily.	Total for Year.	Average Daily.		
.....						2,166,234,000	5,934,888
.....						1,178,106,000	3,227,688
.....						1,134,069,000	3,107,038
.....						574,131,000	1,572,961
.....		1,187,495,000	3,253,411			1,187,495,000	3,253,411

Source of Supply.	Underground Water.			
	Driven Wells.		Infiltration Galleries.	
	Total for Year.	Average Daily.	Total for Year.	Average Daily.
Jameco (driven well station)	744,422,000	2,039,512		
Jameco Deep Wells (Titus Contract)	1,138,560,000	3,119,342		
St. Albans (driven well station)	759,555,000	2,080,973		
Springfield (driven well station)	906,992,000	2,484,910		
Springfield Filter Plant (Springfield Pond)				
Rosedale (driven well station)	574,315,000	1,573,466		
Forest Stream (driven well station)	1,277,664,000	3,500,449		
Forest Stream Filter Beds				
Clear Stream (driven well station)	920,674,000	2,522,394		
Watts Pond (driven well station)	1,511,261,600	4,140,441		
Queens County Water Company (driven well station)	1,331,572,000	3,648,142		
Smiths Pond				
Hempstead Filter Beds (Horse Brook)				
Supply Ponds—Gravity				
New Water Sheds.				
Agawam (driven well station)	663,071,000	1,816,635		
Merrick (driven well station)	929,452,000	2,546,444		
Matowa (driven well station)	846,255,000	2,318,507		
Wantagh (driven well station)	855,518,000	2,343,885		
Wantagh (infiltration galleries)			4,186,150,000	11,468,904
Seaford (infiltration galleries)			474,470,000	1,299,918
Massapequa (driven well station)	759,817,000	2,081,690		
Massapequa (infiltration galleries)			1,569,896,000	4,301,085
Mansfields Pond				
Massapequa Emergency Stations (infiltration galleries)			1,398,652,000	3,831,923
Amityville (driven well station)	66,681,000	182,688		
Supply Ponds—Gravity				
Total	18,338,349,000	50,242,051	7,629,168,000	20,901,830

Surface Water.						Total U. S. Gallons Delivered During Year.	Average U. S. Gallons Delivered Per Day.
Pond Pumping.		Filter Plants.		Gravity.			
Total for Year.	Average Daily.	Total for Year.	Average Daily.	Total for Year.	Average Daily.		
.....						744,422,000	2,039,513
.....						1,138,560,000	3,119,342
.....						759,555,000	2,080,973
.....						906,992,000	2,484,910
.....		513,609,000	1,407,148			513,609,000	1,407,148
.....						574,315,000	1,573,466
.....						1,277,664,000	3,500,449
.....		807,837,000	2,213,252			807,837,000	2,213,252
.....						920,674,000	2,522,394
.....						1,511,261,000	4,140,441
.....						1,331,572,000	3,648,142
2,987,375,000	8,184,589					2,987,375,000	8,184,589
.....		308,181,550	844,333			308,181,550	844,333
.....				1,101,791,450	3,018,607	1,101,791,450	3,018,607
.....						663,071,000	1,816,633
.....						929,452,000	2,546,444
.....						846,255,000	2,318,507
.....						855,518,000	2,343,885
.....						4,186,150,000	11,468,904
.....						474,470,000	1,299,918
.....						759,817,000	2,081,690
.....						1,569,896,000	4,301,085
116,983,000		320,501				116,983,000	320,501
.....						1,398,652,000	3,831,923
.....						66,681,000	182,688
.....				9,727,163,000	26,649,762	9,727,163,000	26,649,762
3,104,358,000	8,505,090	2,817,122,550	7,718,144	10,828,954,450	29,668,369	42,717,952,000	117,035,485

Percentage of underground water to total supply	60.79
Percentage of pond water to total supply	7.27
Percentage of filtered water to total supply	6.59
Percentage of gravity supply to total supply	25.35

TABLE

Water Mains Laid and Removed and Gates and

	48-inch.	42-inch.	36-inch.	30-inch.	24-inch.	20-inch.
Water Mains Laid.						
Total to December 31, 1905.....	139,480	13	60,184	62,759	20,545	255,691
During 1906.....	4,421			5,870	10,298	13,884
Total to December 31, 1906....	143,901	13	60,184	68,629	30,843	269,575
Removed during 1906.....						30
Total feet December 31, 1906..	143,901	13	60,184	68,629	30,843	269,545
Total miles December 31, 1906..	27.254	.002	11.398	12.998	5.841	51.050

	48-inch.	42-inch.	36-inch.	30-inch.	24-inch.	20-inch.
Gates Set.						
Total to December 31, 1905.....	17		32	50	36	408
During 1906	1		6	13	16	28
Total to December 31, 1906.....	18		38	63	52	436
Removed during 1906.....						
Net total, 1906.....	18		38	63	52	436

No. 13.

Hydrants Set and Removed to December 31, 1906.

16-inch.	14-inch.	12-inch.	10-incb.	8-inch.	6-inch.	4-inch.	Total.	Total Miles.
80.820	3.159	420.617	19.601	924,036	2,052,948	55,565	4,095,418	775.647
4.117		33.982		91,477	17,958	17	182,024	34.474
84.937	3.159	454.599	19,601	1,015,513	2,070,906	55.582	4,277,442	810.121
....		5		98	25.087		25,220	4.776
84,937	3.159	454.594	19,601	1,015,415	2,045,819	55,582	4,252,222	805.345
16.087	.598	86.099	3.712	192.313	387.466	10.527	805.345	

16-inch.	14-inch.	12-inch.	10-inch.	8-inch.	6-inch.	4-inch.	Total.	Hydrants Set.
70	1	773	7	2,043	4,541	91	8,069	9.272
15		120	1	368	1,095		1,663	1,290
85	1	893	8	2,411	5,636	91	9.732	10,562
....					42		42	40
85	1	893	8	2,411	5,594	91	9,690	10.542

TABLE No. 14.

High Pressure Fire Service Mains Laid, Gates and Hydrants Set to December 31, 1906.

Mains Laid and Year.	20-inch.	16-inch.	12-inch.	8-inch.	Total Linear Feet.	Total Miles
Total to December 31, 1905.....	5,522	12,024	16,000	785	34.331	6.502
During 1906.....	19,258	23,975	36,737	3,461	83,431	15.801
Total to December 31, 1906.	24,780	35,999	52,737	4,246	117.762	22.303

Gates Set.	20-inch.	16-inch.	12-incb.	8-inch.	Total.	Hydrants Set.
Total to December 31, 1905	13	28	51	207	299	47
During 1906.....	55	76	92	510	733	465
Total to Deember 31, 1906.	68	104	143	717	1,032	512

TABLE

Water Mains Laid, Gates and

	Linear Feet of Pipe Laid.					
	48.	30.	24.	20.	16.	12.
Atlantic avenue, from Wyona street to Vermont avenue						246
Avenue P, from East Ninth street to East Fifteenth street						
Avenue Q, from Coney Island avenue to East Thirteenth street						
Avenue O, from Gravesend avenue to East Third street						
Adams street, from Myrtle avenue to Front street						
Avenue S, from Coney Island avenue to East Sixteenth street		1,456		6	28	17
Amos street, from Morgan avenue to Debevoise avenue						
Atlantic avenue, from Crescent street to Ridgewood Pumping Station	1,270	12				
Bedford avenue, from Eastern parkway to Douglas street						597
Bedford avenue, crossing Eastern parkway					231	28
Bay avenue, from Elm avenue to Locust avenue						
Blake avenue, from Grafton street to Hunterfly road						
Bay Eleventh street, from Bath avenue to Benson avenue						
Bay Eighth street, from Bath avenue to Benson avenue						
Bay Twenty-first street, from Bath avenue to Benson avenue						
Broadway, from Hooper street to Myrtle avenue						
Broadway, from Decatur street to Cooper street						
Bedford avenue, from Rutledge street to DeKalb avenue						
Bushwick avenue, from Devoe street to Flushing avenue						
Blake avenue, from Essex street to the New Lots Pumping Stations			2,118		47	40
Belmont avenue, from Crescent street to Fountain avenue				1,473		
Bay Twenty-third street, from Bath avenue to Cropsey avenue						
Bay Thirty-second street, from Cropsey avenue to dock						
Beard street, from Dwight street to Otsego street						
Beadel street, from Porter avenue to Morgan avenue						
Bartlett street, from Harrison avenue to Throop avenue						
Boerum street, from Broadway to Lorimer street						
Court street, from Atlantic avenue to President street						
Calyer street, from Eckford street to Franklin street						
Clymer street, from Kent avenue to Wythe avenue						
Crescent street, from Atlantic avenue to Belmont avenue	2,257			450		6
Calyer street, from Newell street to Humboldt street						
Carroll street, from Nostrand avenue to New York avenue						
Cropsey lane, from Cropsey avenue to dock						

No. 15.

Hydrants Set During 1906.

Gates Set.													Hydrants Set.
8.	6.	4.	48.	36.	30.	24.	20.	16.	12.	10.	8.	6.	
....		..	..	..	..	..	..	..	2	..	..		
1,604	61	..	..	..	..	..	..	..	2	..	3	8	8
528	13	..	..	..	..	..	..	..	..	..	1	2	2
574	18	..	..	..	..	..	..	..	..	..	1	3	3
....	96	..	..	..	..	..	..	..	..	..	..	16	16
....	10	..	..	..	3	..	1	..	1	..	..	1	1
100		..	..	..	..	..	..	..	..	..	1		
....		..	..	1	1	..	..	..	..	..	..		
....	21	..	..	..	..	..	..	..	2	..	1	3	3
....		..	..	..	..	..	..	1	2	..	..		
....	631	..	..	..	..	..	..	..	..	..	..	3	2
376	14	..	..	..	..	..	..	..	..	..	1	2	2
738	29	..	..	..	..	..	..	..	..	..	2	4	4
535	21	..	..	..	..	..	..	..	..	..	1	3	3
490	21	..	..	..	..	..	..	..	..	..	1	3	3
....	99	..	..	..	..	..	..	..	..	..	..	11	11
....	5	..	..	..	..	..	..	..	..	..	..	1	1
....	104	..	..	..	..	..	..	..	..	..	..	16	16
....	170	..	..	..	..	..	..	..	..	..	..	20	20
129	68	..	..	..	..	6	..	..	1	..	5	7	7
38	59	..	..	..	..	..	3	..	..	..	2	6	6
528		..	..	..	..	..	..	..	..	..	2		2
360	14	..	..	..	..	..	..	..	..	..	1		2
297		..	..	..	..	..	..	..	..	..	..	1	1
1,040	28	..	..	..	..	..	..	..	..	..	3	4	4
....	11	..	..	..	..	..	..	..	..	..	..	1	1
....	18	..	..	..	..	..	..	..	..	..	..	3	3
....	162	..	..	..	..	..	..	..	..	..	..	18	18
....	56	..	..	..	..	..	..	..	..	..	..	8	8
612	27	..	..	..	..	..	..	..	..	..	3	5	4
19	21	..	..	2	1	..	1	..	2	..	1	2	2
931		..	..	..	..	..	..	..	..	..	2	7	7
522		..	..	..	..	..	..	..	..	..	1		2
300		..	..	..	..	..	..	..	..	..	1		2

	Linear Feet of Pipe Laid.					
	48.	30.	24.	20.	16.	12.
Chestnut avenue, from Coney Island avenue to Bay avenue						
Degraw street, from Kingston avenue to Brooklyn avenue						
Devoe street, from Leonard street to Bushwick avenue						
Division avenue, from Kent avenue to Broadway						
Decatur street, from Central avenue to Broadway						
Driggs avenue, from Eckford street to North Twelfth street						
Decatur street, from Hamburg avenue to Knickerbocker avenue						
Diamond street, from Meserole avenue to Greenpoint avenue						
Eighty-eighth street, from First avenue to Second avenue						
Eastern Parkway, from Rogers avenue to Nostrand avenue					725	
Elm avenue, from Coney Island avenue to Bay avenue						
East Twenty-second street, near Avenue O						
Eleventh avenue, from Fifty-second street to Fifty-fifth street						757
Eighty-second street, from First avenue to Second avenue						
Eighty-eighth street, from First avenue to Shore road						
Eighty-fifth street, from Third avenue to First avenue						
Eightieth street, from First avenue to Second avenue						
East Ninth street, from Kings highway to Avenue O						
East Tenth street, from Avenue O to Avenue Q						
East Twelfth street, from Kings highway to Avenue O						
East Thirteenth street, from Kings highway to Avenue O						
East Fourteenth street, from Kings highway to Avenue O						
East Fifteenth street, from Kings highway to Avenue O						
East Eighth street, from Avenue M to 200 feet south of Avenue M						
East Second street, from Avenue N to Avenue P						
East Sixteenth street, from Avenue S to Neck road		350			67	18
Forty-fifth street, from Seventh avenue to New Utrecht avenue						
Fifty-third street, from Eleventh avenue to New Utrecht avenue						
Fifty-fourth street, from Eleventh avenue to New Utrecht avenue						
Forty-second street, from New Utrecht avenue to Ninth avenue						
Forty-third street, from New Utrecht avenue to Ninth avenue						
Fifth avenue, from Seventy-second street to Eighty-fourth street						1,678
Fifth avenue, from Seventy-seventh street to Eighty-sixth street						1,058
Fifth avenue, from Sixty-seventh street to Seventy-seventh street						2,783
Fifty-fourth street, from Eleventh avenue to Twelfth avenue						
Forty-second street, from Twelfth avenue to Fourteenth avenue						

Gates Set.												Hydrants Set.	
8.	6.	4.	48.	36.	30.	24.	20.	16.	12.	10.	8.	6.	
....	1,741	..	..	..	..	..	..	..	..	..	..	6	4
737	23	..	..	..	..	..	..	..	..	..	2		3
....	24	..	..	..	..	..	..	..	..	..	..	3	3
....	97	..	..	..	..	..	..	..	..	..	..	15	15
....	24	..	..	..	..	..	..	..	..	..	..	4	4
....	33	..	..	..	..	..	..	..	..	..	..	6	6
691	21	..	..	..	..	..	..	..	..	..	2	3	3
876	28	..	..	..	..	..	..	..	..	..	1	4	4
726	23	..	..	..	..	..	..	..	..	..	..		3
....	28	..	..	..	..	..	..	1	..	..	2	4	4
....	1,940	..	..	..	..	..	..	..	..	..	..	7	5
351	8	..	..	..	..	..	..	..	..	..	1	1	1
5	25	..	..	..	..	..	..	..	1	..	..	4	4
779	35	..	..	..	..	..	..	..	..	..	2		4
1,077	35	..	..	..	..	..	..	..	..	..	3		5
1,089	44	..	..	..	..	..	..	..	..	..	3	6	6
739	26	..	..	..	..	..	..	..	..	..	2	4	4
2,017	84	..	..	..	..	..	..	..	..	..	5	10	10
1,729	65	..	..	..	..	..	..	..	..	..	4	8	8
1,951	59	..	..	..	..	..	..	..	..	..	6	8	8
1,942	59	..	..	..	..	..	..	..	..	..	6	8	8
1,950	60	..	..	..	..	..	..	..	..	..	5	8	8
1,883	69	..	..	..	..	..	..	..	..	..	5	9	9
203	7	..	..	..	..	..	..	..	..	..	1	1	1
1,986	53	..	..	..	..	..	..	..	..	..	5	9	9
....		..	..	..	3	..	..	..	..	..	..		
2,823		..	..	..	..	..	..	..	..	..	8		
1,302	37	..	..	..	..	..	..	..	..	..	4	6	6
889	25	..	..	..	..	..	..	..	..	..	3	4	4
1,288		..	..	..	..	..	..	..	..	..	3		
1,500		..	..	..	..	..	..	..	..	..	3		
....	31	..	..	..	..	..	..	..	3	..	..		5
....	40	..	..	..	..	..	..	..	2	..	..	10	4
102	133	..	..	..	..	..	..	..	6	..	6	13	9
575	20	..	..	..	..	..	..	..	..	..	1	3	3
1,102	38	..	..	..	..	..	..	..	..	..	3	6	6

	Linear Feet of Pipe Laid.					
	48.	30.	24.	20.	16.	12.
First avenue, from Eighty-second street to Eighty-third street						
Forty-first street, from Eighth avenue to Ninth avenue						
Fort Hamilton avenue, from New Utrecht avenue to Forty-fifth street						
Fort Hamilton avenue, from Forty-fourth street to Seventy-ninth street		4,052	4,043	24	1,054	178
Fort Hamilton avenue, from Forty-fourth street to Gravesend avenue				3,461		26
Fifteenth avenue, from Seventy-sixth street to Eighty-sixth street						2,625
Forty-fourth street, from Fort Hamilton avenue to Seventh avenue				2,938	6	
Fountain avenue, from Blake avenue to (old) New Lots Pumping Station					209	
Fountain avenue, from Belmont avenue to new pumping station at New Lots				1,135	86	
Fourth avenue, from Dean street to Flatbush avenue						
Flushing avenue, from Broadway to Cypress avenue						
Flushing avenue, from Harrison avenue to Lee avenue						21
Fifty-second street, from Ninth avenue to Fort Hamilton avenue						
Fifth street, from Second avenue to Gowanus Canal						
Glenmore avenue, from Hemlock avenue to Railroad avenue						
Grafton street, from Sutter avenue to Blake avenue						
Grafton street, from East New York avenue to Sutter avenue						
Greenpoint avenue, from Manhattan avenue to Leonard street						
Guernsey street, from Calyer street to Nassau avenue						
Grand street, from Catherine street to Metropolitan avenue						
Graham street, from Flushing avenue to Lafayette avenue						3,442
Gerry street, from Marcy avenue to Throop avenue						
Gelston street, from Eighty-sixth street to Ninety-second street						
Glenmore avenue, from Logan street to Millford street						
Grattan street, from Porter street to Varick street						
Glenmore avenue, at Crescent street	45					
Havens place, from Herkimer street to Atlantic avenue						
Hale avenue, from Fulton street to Atlantic avenue						
Hunterfly road, from Blake avenue to Rockaway parkway						
Hamilton avenue, from Conover street to Richards street						
Hewes street, from Kent avenue to Wythe avenue						
Hancock street, from Knickerbocker avenue to Irving avenue						
Highland boulevard, from Vermont street to Miller avenue						475
Hausman street, from Nassau avenue to Norman avenue						
Harman street, from St Nicholas avenue to borough line						
Humboldt street, from Calyer street to Meserole avenue						

			Gates Set.										Hydrants Set.
8.	6.	4.	48.	36.	30.	24.	20.	16.	12.	10.	8.	6.	
238	13	..	..	..	..	..	..	..	..	..	..	3	2
758	28	..	..	..	..	..	..	..	..	..	2	4	4
213	7	..	..	..	..	..	..	..	..	..	1	1	1
2,371	469	..	..	..	5	5	..	2	3	..	36	57	49
9	182	..	..	..	..	..	5	..	1	..	..	20	15
97	102	..	..	..	..	..	..	..	5	..	1	9	9
86	118	..	..	..	..	..	5	..	..	..	2	20	14
....		..	..	..	..	..	..	3	..	..	..		
....	15	..	..	..	..	..	3	2	..	..	..	2	2
....	36	..	..	..	..	..	..	..	..	..	..	3	3
....	186	..	..	..	..	..	..	..	..	..	..	26	26
....	34	..	..	..	..	..	..	..	..	..	..	5	5
1,025	28	..	..	..	..	..	..	..	..	..	4	4	4
278		..	..	..	..	..	..	..	..	..	1		1
285	7	..	..	..	..	..	..	..	..	..	..	1	1
617	22	..	..	..	..	..	..	..	..	..	3	3	3
983	28	..	..	..	..	..	..	..	..	..	1	4	4
....	4	..	..	..	..	..	..	..	..	..	..	1	1
....	32	..	..	..	..	..	..	..	..	..	..	5	5
....	24	..	..	..	..	..	..	..	..	..	..	4	4
98	157	..	..	..	..	..	..	..	11	..	6	25	22
....	33	..	..	..	..	..	..	..	..	..	..	3	3
1,475	19	..	..	..	..	..	..	..	..	..	6	3	3
323	11	..	..	..	..	..	..	..	..	..	2	1	1
459	14	..	..	..	..	..	..	..	..	..	2		2
....		..	..	1	..	..	..	..	..	..	..		
....	391	..	..	..	..	..	..	..	..	..	..	1	2
691	22	..	..	..	..	..	..	..	..	..	1	3	3
1,108	37	..	..	..	..	..	..	..	..	..	1	5	5
....	38	..	..	..	..	..	..	..	..	..	..	5	5
522	25	..	..	..	..	..	..	..	..	..	3	5	3
678	21	..	..	..	..	..	..	..	..	..	1		3
....	14	..	..	..	..	..	..	..	..	..	..		2
541		..	..	..	..	..	..	..	..	..	1	3	3
321		..	..	..	..	..	..	..	..	..	1	2	2
700		..	..	..	..	..	..	..	..	..	2	3	3

	Linear Feet of Pipe Laid.					
	48.	30.	24.	20.	16.	12.
Halsey street, from Knickerbocker avenue to Irving avenue						
Jewell street, from Norman avenue to Meserole avenue						
Johnson avenue, from Lorimer street to Leonard street						
Kingston avenue, at Degraw street						
Kingston avenue, from Eastern parkway to President street						
Kings highway, from East Thirteenth street to East Fifteenth street						
Knickerbocker avenue, from Johnson avenue to Putnam avenue						
Kent street, from West street to Franklin street						
Lombardy street, from Kingsland avenue to Morgan avenue						
Locust avenue, from Coney Island avenue to Bay avenue						
Leonard street, from Greenpoint avenue to Devoe street						
Linden street, from Knickerbocker avenue to Myrtle avenue						
Montauk avenue, from Sutter avenue to New Lots road					8	
Manhattan avenue, from Kent street to Greenpoint avenue						
Maujer street, from Bushwick avenue to Union avenue						
Meserole street, from Union avenue to Leonard street						
Morton street, from Kent avenue to Wythe avenue				5		
Mercein street, from Garrison street to New York and Brooklyn Bridge						
Meserole avenue, from Guernsey street to Banker street						
Milford street, from Blake avenue to New Lots road					4	
Miller avenue, from Highland boulevard to Sunnyside avenue						325
Montauk avenue, from Blake avenue to Pitkin avenue					1,642	
Ninety-seventh street, from Marine avenue to Shore road						
Nicholls avenue, from Union street to Fulton street						
Nicholls avenue, from Fulton street to Atlantic avenue						
Ninety-first street, from Third avenue to Fourth avenue						755
Ninety-first street, from First avenue to Third avenue						1,572
New Utrecht avenue, from Forty-second street to Fort Hamilton avenue						
New street, from Courtlandt street to West Fifth street						
Ninth avenue, from Seventeenth street to Twentieth street						
Nostrand avenue, from Willoughby avenue to Atlantic avenue						
North Fourth street, from Kent avenue to Berry street						7
North Fifth street, from Kent avenue to Wythe avenue						.. .
North Sixth street, from Kent avenue to Berry street						6
North Tenth street, from Kent avenue to Bedford avenue						69
North Eleventh street, from Kent avenue to Bedford avenue						67

			Gates Set.										Hydrants Set.
8.	6.	4.	48.	36.	30.	24.	20.	16.	12.	10.	8.	6.	
685	21	..	..	..	..	..	..	..	..	..	1	2	3
613	33	..	..	..	..	..	..	..	..	..	1	3	3
....	12	..	..	..	..	..	..	..	..	..	..	2	2
32		..	..	..	..	..	..	..	..	..	..		
768	21	..	..	..	..	..	..	..	..	..	6		3
538	14	..	..	..	..	..	..	..	..	..	1	2	2
....	150	..	..	..	..	..	..	..	..	..	..	28	28
....	6	..	..	..	..	..	..	..	..	..	..	1	1
616	14	..	..	..	..	..	..	..	..	..	1		2
....	1,515	..	..	..	..	..	..	..	..	..	..	6	4
....	135	..	..	..	..	..	..	..	..	..	..	18	18
893	28	..	..	..	..	..	..	..	..	..	2	4	4
1,093	30	..	..	..	..	..	..	1	..	..	2		4
....	10	..	..	..	..	..	..	..	..	..	..	1	1
....	66	..	..	..	..	..	..	..	..	..	..	11	11
....	21	..	..	..	..	..	..	..	..	..	..	3	3
564	31	..	..	..	..	..	..	..	..	..	3	4	3
....	123	..	..	..	..	..	..	..	..	..	..	2	1
489		..	..	..	..	..	..	..	..	..	1	3	3
440	15	..	..	..	..	..	..	..	..	..	2		2
....	18	..	..	..	..	..	..	..	2	..	..	2	2
27	82	..	..	..	..	..	..	3	..	..	3	9	8
615	15	..	..	..	..	..	..	..	..	..	..		2
723	15	..	..	..	..	..	..	..	..	..	2		2
718	30	..	..	..	..	..	..	..	..	..	2	4	4
8	28	..	..	..	..	..	..	..	1	..	..	4	4
....	61	..	..	..	..	..	..	..	5	..	..	4	8
923	28	..	..	..	..	..	..	..	..	..	4	5	4
297	19	..	..	..	..	..	..	..	..	..	1	2	2
....	36	..	..	..	..	..	..	..	..	..	..	6	6
....	162	..	..	..	..	..	..	..	..	..	..	27	27
898	52	..	..	..	..	..	..	..	..	..	5	7	7
462	51	..	..	..	..	..	..	..	..	..	2	3	3
982	44	..	..	..	..	..	..	..	..	..	6	6	6
1,447	66	13	..	..	..	..	..	..	2	..	8	10	10
1,440	110	4	..	..	..	..	..	..	2	..	7	10	10

	Linear Feet of Pipe Laid.					
	48.	30.	24.	20.	16.	12.
North Third street, from Kent avenue to Berry street						6
Neptune avenue, from West Thirty-sixth street to Seagate						
Nineteenth street, from Tenth avenue to Eleventh avenue						
One Hundred and First street, from Fourth avenue to Fort Hamilton avenue						
Pitkin avenue, from conduit to Crescent street	849					3
Pine street, from Ridgewood avenue to Etna street						
President street, from Bedford avenue to Rogers avenue						652
President street, from Hamilton avenue to Court street						
Rogers avenue, from Eastern parkway to Crown street						1,409
Ridge court, from Seventy-second street to end of street						
Rutledge street, from Broadway to Bedford avenue						
Rockaway avenue, from Bainbridge street to Bergen street						
Rush street, from Kent avenue to Wythe avenue						
Seventh avenue, from Forty-fourth to Forty-sixth street						515
Seventy-first street, from Fifteenth avenue to New Utrecht avenue						535
Seventy-fifth street, from Seventh avenue to Fort Hamilton avenue				549		3
Seventy-first street, from connection at New Utrecht avenue						76
Seventy-first street, from Second avenue to Third avenue						
Seventh avenue, from Forty-ninth street to Fifty-first street						514
Seventy-fifth street, from Second avenue to Shore road						
Seventy-second street, from Seventh avenue to Sixth avenue						
Sixth avenue, from Seventy-second street to Seventy-third street						
Seventy-fourth street, from Fifth avenue to Sixth avenue						
Sixth avenue, from Seventy-third street to Seventy-fourth street						
Sixteenth avenue, from Sixty-ninth street to Seventieth street						
Seventeenth avenue, from Sixtieth street to Sixty-third street						810
Sixty-first street, from Sixteenth avenue to Seventeenth avenue						
Sutter avenue, from Pennsylvania avenue to Sheffield street						
Seventy-fifth street, from Fort Hamilton avenue to Tenth avenue				818		
South First street, from Union avenue to Kent avenue						
Stagg street, from Lorimer street to Bushwick avenue						
South Fourth street, from Kent avenue to Wythe avenue						
South Fifth street, from Kent avenue to Wythe avenue						
South Ninth street, from Kent avenue to Wythe avenue						
South Eleventh street, from Kent avenue to Wythe avenue						
Seventy-sixth street, from Second avenue to Third avenue						

			Gates Set.										Hydrants Set.
8.	6.	4.	48.	36.	30.	24.	20.	16.	12.	10.	8.	6.	
985	60	..	..	..	..	..	..	..	..	..	5	7	7
310		..	..	..	..	..	..	..	..	..	1		
248	14	..	..	..	..	..	..	..	..	..	..	2	2
599	26	..	..	..	..	..	..	..	..	..	..		3
....		..	1	2	..	..	..	..	1	..	..		
326	7	..	..	..	..	..	..	..	..	..	1		1
....	23	..	..	..	..	..	..	..	2	..	..	3	3
....	72	..	..	..	..	..	..	..	..	..	..	11	11
12	34	..	..	..	..	..	..	..	4	..	..	4	4
217	7	..	..	..	..	..	..	..	..	..	..		1
....	49	..	..	..	..	..	..	..	..	..	..	7	7
....	84	..	..	..	..	..	..	..	..	..	..	14	14
431	25	..	..	..	..	..	..	..	..	..	3	3	3
6	21	..	..	..	..	..	..	..	2	..	..	3	3
....	14	..	..	..	..	..	..	..	2	..	..	2	2
....	10	..	..	..	..	..	1	..	1	..	..	2	2
....		..	..	..	..	..	..	..	..	..	..		
762		..	..	..	..	..	..	..	..	..	2		
....	19	..	..	..	..	..	..	..	1	..	1	3	3
9	1,882	..	..	..	..	..	..	..	..	..	..	14	9
821	41	..	..	..	..	..	..	..	..	..	2		4
285	7	..	..	..	..	..	..	..	..	..	..		1
755	29	..	..	..	..	..	..	..	..	..	2		4
158	7	..	..	..	..	..	..	..	..	..	..		1
256	7	..	..	..	..	..	..	..	..	..	2	1	1
....	28	..	..	..	..	..	..	..	2	..	..	4	4
607	21	..	..	..	..	..	..	..	..	..	1	3	3
....	215	..	..	..	..	..	..	..	..	..	..		1
....	41	..	..	..	..	..	1	..	..	..	..	4	4
....	123	..	..	..	..	..	..	..	..	..	..	19	19
....	52	..	..	..	..	..	..	..	..	..	..	8	8
500	47	..	..	..	..	..	..	..	..	..	3	4	4
502	23	..	..	..	..	..	..	..	..	..	3	3	3
404	27	..	..	..	..	..	..	..	..	..	3	3	3
312	14	..	..	..	..	..	..	..	..	..	3	2	2
841	21	..	..	..	..	..	..	..	..	..	3	3	3

	Linear Feet of Pipe Laid.					
	48.	30.	24.	20.	16.	12.
Silliman place, from Second avenue to Third avenue						
Sixth avenue, from Seventy-fifth street to Seventy-sixth street						309
Seigel street, from White street to Bogart street.						
Stanhope street, from St. Nicholas avenue to Cypress avenue						
Suydam street, from St. Nicholas avenue to Wyckoff avenue						
Sherman street, from Tenth avenue to Eleventh avenue						
Sixty-second street, from Twentieth avenue to Twenty-second avenue						
Sixty-fifth street, from Eighteenth avenue to Nineteenth avenue						
Spencer street, from Myrtle avenue to Park avenue						
Tenth avenue, from Seventy-fifth street to Eighty-sixth street				3,000		
Third avenue from Eightieth street to Eighty-first street						
Twelfth avenue, from Fifty-third street to Fifty-sixth street						
Thornton street, from Throop avenue to Broadway						
Throop avenue, from Flushing avenue to DeKalb avenue						
Ten Eyck street, from Union avenue to Bushwick avenue						
Thames street, from Porter street to Varick street						
Union street, from Kingston avenue to Albany avenue						
Union avenue, from Broadway to Driggs avenue.						
Utica avenue, from East New York avenue to Church avenue			4,137		10	6
Vernon street, from Atlantic avenue to Highland boulevard						1,869
West Nineteenth street, from Neptune avenue to Mermaid avenue						
West street, from Eagle street to Kent street						
Wythe avenue, from Flushing avenue to North Thirteenth street				25		10,479
West Ninth street, from Hicks street to Henry street						
West Sixteenth street, from Neptune avenue to Surf avenue						
Willoughby avenue, from Wyckoff avenue to St. Nicholas avenue						
Wallahout street, from Lee avenue to Throop avenue						
Miscellaneous						
Total	4,421	5,870	10,298	13,884	4,117	33,982

Plate No. 4385, File K-6.

			Gates Set.										Hydrants Set.
8.	6.	4.	48.	36.	30,	24.	20.	16.	12.	10.	8.	6.	
832	15	..	..	..	..	..	..	..	..	..	2	3	1
108		..	..	..	..	..	..	..	1	..	1	1	1
....	300	..	..	..	..	..	..	..	..	..	..		2
....	120	..	..	..	..	..	..	..	..	..	..	1	1
503	14	..	..	..	..	..	..	..	..	..	1	2	2
720	21	..	..	..	..	..	..	..	..	..	..		3
1,522	56	..	..	..	..	..	..	..	..	..	4	8	8
1,394	21	..	..	..	..	..	..	..	..	..	2	3	3
....	24	..	..	..	..	..	..	..	..	..	..	2	2
653	174	..	..	..	..	..	7	1	..	..	5	20	19
174	7	..	..	..	..	..	..	..	..	..	2	1	1
783	25	..	..	..	..	..	..	..	..	..	2	4	4
....	8	..	..	..	..	..	..	..	..	..	..	1	1
....	77	..	..	..	..	..	..	..	..	..	..	11	11
....	52	..	..	..	..	..	..	..	..	..	..	8	8
458	14	..	..	..	..	..	..	..	..	..	2		2
620	21	..	..	..	..	..	..	..	..	..	1		3
....	196	..	..	..	..	..	..	..	..	..	..	28	28
6	122	..	..	..	..	5	..	..	..	..	..	15	15
203	84	..	..	..	..	..	..	..	4	..	3	11	7
811	21	..	..	..	..	..	..	..	..	..	2	3	3
....	72	..	..	..	..	..	..	..	..	..	..	9	9
1,317	622	..	..	..	..	..	1	..	42	..	44	79	79
519	14	..	..	..	..	..	..	..	..	..	2		2
1,260		..	..	..	..	..	..	..	..	..	3		5
494	14	..	..	..	..	..	..	..	..	..	1	2	2
8	67	..	..	..	..	..	..	..	..	..	..	6	6
564	821	..	..	..	..	..	..	1	2	1	..		164
91,477	17,958	17	1	6	13	16	28	15	120	1	368	1,095	1,290

TABLE

High Pressure Fire Service Mains Laid,

Location of Work.
Bowne street, at Richards street connection
Bowne street, from Commerce street to Richards street
Furman street, Pumping Station at Joralemon street
Furman street, at Fulton street crossing
Furman street, from Doughty street to Fulton street
State street, from Clinton street to Court street
State street, from Furman street to Court street
Hamilton avenue, at Richards street connection
Hamilton avenue, from Van Brunt street to North Pier street
Lawrence street, at Willoughby street connection
Hudson avenue, at Willoughby street connection
Hudson avenue, at DeKalb avenue connection
Hudson avenue, from Johnson street to Myrtle avenue
Hudson avenue, from John street to York street
Imlay street, at Hamilton avenue connection
Imlay street, from Hamilton avenue to William street
Summit street, from Imlay street to India wharf
Sullivan street, from Ferris street to Richards street
Conover street, from Coffey street to Reid street
Conover street, from King street to William street
William street, from Conover street to Richards street
Commerce street, from Richards street to Imlay street
Ferris street, from King street to Van Dyke street
Dikeman street, from Ferris street to river
Van Brunt street, from Sullivan street to Reid street
Van Brunt street, from Hamilton avenue to Harrison street
Coffey street, from Ferris street to Van Brunt street
Richards street, from Verona street to Hamilton avenue
Richards street, from Sullivan street to Hamilton avenue
President street, from Columbia street to Hicks street
North Pier street, from Hamilton avenue to India wharf
Hicks street, from Woodhull street to Baltic street
Hicks street, from Joralemon street to Middagh street
Sackett street, from Van Brunt street to Hicks street

No. 16.

Gates and Hydrants Set During 1906.

Linear Feet of Pipe Laid.				Gates Set.				Hydrants Set.
20-inch.	16-inch.	12-inch.	8-inch.	20-inch.	16-inch.	12-inch.	8-inch.	
....		21		..	..	..	..	..
....			18.0	..	..	..	..	4
169				2	..	..	..	..
153				..	..	..	..	..
....			12.0	..	..	..	..	3
611				..	..	..	..	..
....			80.5	..	..	..	3	12
....		31		..	..	..	..	..
....	169	876	18.0	..	2	1	..	1
....		51		..	..	..	..	..
....		54		..	..	..	..	..
....		67		..	..	..	..	..
....		475	2.0	..	..	1	2	..
....		983	79.0	..	..	2	10	10
....	19			..	..	..	..	..
....			22.5	..	..	..	..	5
....		384	24.0	..	..	..	4	3
....			20.0	..	..	..	..	5
....			10.0	..	..	..	..	2
....			4.0	..	..	..	..	1
....			27.5	..	..	..	..	6
....			13.5	..	..	..	..	3
....			52.0	..	..	..	..	8
....			9.0	..	..	..	..	2
....			62.0	..	..	..	..	13
....	1,955		55.0	..	8	..	14	14
....			18.0	..	..	..	..	4
....	1,449			..	5	..	..	..
....			47.0	..	..	..	10	18
....		542	10.0	..	..	1	2	2
....		220	15.5	..	..	..	2	2
....	2,611		76.0	..	8	..	17	12
962	279	500	105.0	2	3	2	16	12
....		1,130	29.0	..	..	3	6	6

Location of Work.

Sedgwick street, from Van Brunt street to Columbia street.....
Columbia street, from Sedgwick street to Degraw street.....
Columbia street, from Harrison street to State street.....
Henry street, from Baltic street to Clark street.....
Henry street, from Middagh street to Fulton street.....
Degraw street, from Columbia street to Hicks street.....
Harrison street, from Van Brunt street to Hicks street.....
Baltic street, from Hicks street to Henry street.....
Congress street, from Henry street to Columbia street.....
Pacific street, from Henry street to river.....
Joralemon street, from Furman street to Hicks street.....
Clinton street, from State street to Fulton street.....
Woodhull street, from Hamilton avenue to Hicks street.....
Pierrepont street, from Columbia Heights to Fulton street.....
Bridge street, from Fulton street to John street.....
Court street, from Fulton street to State street.....
Orange street, from Hicks street to Columbia Heights.....
Montague street, from Hicks street to Columbia Heights.....
Schermerhorn street, from Court street to Third avenue.....
Middagh street, from Henry street to Columbia Heights.....
Prospect street, from Fulton street to Pearl street.....
Prospect street, from Bridge street to Gold street.....
Columbia Heights, from Middagh street to Doughty street.....
Tillary street, from Bridge street to Gold street.....
Johnson street, from Washington street to Raymond street.....
Nassau street, from Bridge street to Gold street.....
Nassau street, from Pearl street to Fulton street.....
Boerum place, from Atlantic avenue to Fulton street.....
Concord street, from Bridge street to Jay street.....
Nevins street, from Fulton street to Atlantic avenue.....
Third avenue, from Schermerhorn street to Atlantic avenue.....
Adams street, from Prospect street to Front street.....
Sands street, from Bridge street to Jay street.....
Atlantic avenue, from Third avenue to Flatbush avenue.....
Jay street, from John street to York street.....
Jay street, from Johnson street to Fulton street.....

Linear Feet of Pipe Laid.				Gates Set.				Hydrants Set.
20-inch.	16-inch.	12-inch.	8-inch.	20-inch.	16-inch.	12-inch.	8-inch.	
....		616	12.0	..	..	2	2	2
....		260	4.0	..	..	..	1	1
....	1,821		38.0	..	7	..	12	12
....	1,596	2,282	137.0	..	6	5	27	21
....		329	20.0	..	..	..	3	3
....		507	17.0	..	..	1	3	3
....	609	492	15.0	..	..	2	5	2
....	464		14.0	..	..	..	3	3
....		974	23.0	..	..	3	4	4
....		1,210	98.5	..	..	4	11	8
645			15.5	2	..	..	3	3
....		2,122	58.5	..	..	6	15	13
....	1,618		29.0	..	1	..	4	4
1,465		474	75.5	5	..	1	13	11
....	2,582	1,885	170.0	..	11	5	31	16
1,316			15.0	5	..	..	2	..
....		465	40.0	..	..	1	4	4
....		301	32.5	..	..	1	2	2
3,644			94.5	12	..	..	21	21
....		961	34.0	..	..	3	6	6
....		989	85.0	..	..	3	9	9
....		504	57.0	..	..	1	5	5
....		509	34.0	..	..	..	6	6
....		500	22.0	..	..	1	4	4
1,881	1,117		138.0	6	3	..	23	23
....		500	30.0	..	..	1	2	2
....		914	10.0	..	..	2	9	..
....		944	69.0	..	..	2	8	7
....		512	38.0	..	..	1	3	3
....		932	80.0	..	..	2	8	8
509			16.0	1	..	..	4	4
....		603	19.0	..	..	1	4	4
....		502	39.0	..	..	1	3	3
932		3	110.0	1	..	..	7	7
....		974	46.0	..	..	2	8	2
....		1,226	19.0	..	..	5	7	2

Location of Work.	
Bond street, from Atlantic avenue to Fulton street	
Raymond street, from Johnson street to Bolivar street	
Willoughby street, from St. Edwards street to Fulton street	
Hoyt street, from Atlantic avenue to Fulton street	
Bolivar street, from Raymond street to St. Edwards street	
St. Edwards street, from Bolivar street to Willoughby street	
Smith street, from Atlantic avenue to Fulton street	
Gold street, from Johnson street to DeKalb avenue	
Gold street, from river to York street	
Washington street, from Plymouth street to Fulton street	
Fulton street, from Hudson avenue to Ashland place	
Fulton street, from Willoughby street to Pierrepont street	
Adams street, from Johnson street to Myrtle avenue	
Adams street, from John street to Plymouth street	
Main street, from York street to river	
Duffield street, from Willoughby street to Fulton street	
Rockwell place, from Fulton street to Flatbush avenue	
Water street, from Hudson avenue to Pearl street	
Water street, from Washington street to Fulton street	
Pearl street, from Water street to Plymouth street	
Plymouth street, from Pearl street to Washington street	
DeKalb avenue, from Rockwell place to Gold street	
Doughty street, from Columbia Heights to Furman street	
Total	

Linear Feet of Pipe Laid.				Gates Set.				Hydrants Set.
20-inch.	16-inch.	12-inch.	8-inch.	20-inch.	16-inch.	12-inch.	8-inch.	
....		968	48.0	..	..	3	5	4
....	771		22.0	..	1	..	4	4
1,740	1,620		92.0	6	6	..	23	23
....		1,145	101.0	..	..	2	8	8
....	362		11.0	..	..	..	2	2
....	353		6.0	..	2	..	1	1
....		1,054	30.0	..	..	4	5	4
....	756	985	18.0	.	1	3	8	2
....		1,390	84.0	..	..	3	16	10
649	2,958		123.0	2	9	..	21	11
....		580	59.0	..	..	2	4	4
820			20.0	1	..	..	3	1
....		386	33.0	..	..	2	2	2
....		208	6.0	..	..	1	1	..
....		753	138.0	..	..	2	10	5
....		631	40.0	..	..	1	4	4
....		469	6.0	..	..	1	1	1
1,797			24.0	5	..	1	7	3
1,179			11.0	3	..	..	5	..
230			3.0	1	..	..	2	..
556			6.0	1	..	..	4	..
....	866	222	15.0	..	3	1	6	..
....		122		..	..	..	..	..
19,258	23,975	36,737	3,461.5	55	76	92	510	465

TABLE

Showing Net Amount of Water Filtered at the Baiseleys and Springfield Filter Plants Million Gallons

Filter.	Net Amount of Filtered Water, U. S. Gallons.
Baiseleys filter plant	1,086,063,400
Springfield filter plant	419,697,950
Forest Stream filter beds	797,933,350
Hempstead filter beds	308,181,550

TABLE

Showing Character of Raw and Filtered Water, at

Plant.	Storm Waters Containing More Than 2,500 Bacteria.					Clear Weather Waters Containing Less Than 2,500 Bacteria.			
	Average.	Average Corresponding Filtrate.	Per Cent. Reduction.	Per Cent. of Samples Showing Above 97 Per Cent. Reduction.	Per Cent. of Time Clear Water Prevails.	Average.	Average Corresponding Filtrate.	Per Cent. of Samples Showing Less Than 100 Bacteria.	Per Cent. of Time Clear Water Prevails.
Baiseleys	11,262	196	98.3	90.0	28.0	863	62	95.6	72.0
Springfield	5,980	185	96.8	76.0	14.2	905	39	97.2	85.8
Forest Stream	7,960	33	99.5	96.0	20.2	1,262	47	89.0	79.8
Hempstead	20,040				41.9	1,470			58.1
Bed No. 1		93	99.5	96.5			21	95.0	
Bed No. 2		51	99.7	96.3			19	97.0	
Bed No. 3		202	98.9	91.4			16	100.0	
Bed No. 4		95	99.5	87.0			25	100.0	

No. 17.

and at the Forest Stream and Hempstead Filter Beds, and Cost of Filtration per During 1906.

Cost of Filtration.					Cost Per Million Gallons.
Operation and Inspection.	Laboratory.	Repairs.	Interest and Sinking Fund.	Total.	
$4,796 00	$454 00	$1,926 00	$3,218 00	$10,394 00	$9 57
3,356 00	221 00	133 00	1,380 00	5,090 00	12 13
2,240 00	449 00		1,200 00	3,889 00	4 87
1,164 00	760 00		392 00	2,316 00	7 52

No. 18.

Baiseleys, Springfield, Forest Stream and Hempstead.

Percentage of Samples Showing Presence of B. Coli.						Turbidity (Parts Per Million Silica).			Color (Parts Per Million Platinum Cobalt).		
Raw. Cubic Centimeters.			Effluent. Cubic Centimeters.								
0.1	1.0	10.0	0.1	1.0	10.0						
Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Raw.	Filtered.	Per Cent. Reduction.	Raw.	Filtered.	Per Cent. Reduction.
20	47	97	..	..	7	20	1	95	31	4	87
21	48	76	..	..	6	5	..	100	19	1	95
10	42	94	..	6	25	5	..	100	12	2	83
43	78	100	..	..	..	14	..	..	12	..	..
..	..	..	..	7	27	..	..	100	..	2	83
..	..	..	..	7	17	..	..	100	..	2	83
..	..	..	..	5	18	..	..	100	..	5	58
..	..	..	..	..	18	..	..	100	..	5	58

TABLE No. 19.

Showing Average Quality of the Water for the Years 1905 and 1906 from the Two Ridgewood Reservoirs.

	1905.	1906.
Physical Examination.		
Turbidity	4.	4.
Color	14.	12.
Per cent. of samples with distinct vegetable odors	0.0	0.2
Per cent. of samples with odors of decomposition	0.4	0.3
Per cent. of samples with odor due to organisms	0.0	0.0
Chemical Examination.		
Albuminoid ammonia	0.049	0.033
Free ammonia	0.021	0.021
Nitrites	0.003	0.003
Nitrates	1.06	1.48
Total solids	69.	81.
Chlorine	7.2	8.7
Hardness	26.	29.
Alkalinity	11.	15.
Iron	0.44	0.53
Microscopical Examination.		
Microscopic organisms	31.	51.
Amorphous matter	231.	280.
Bacteriological Examination.		
Bacteria per cc	363.	269.
Per Cent. of Positive Tests for B. Coli.		
In 0.1 cc	3.9	3.4
In 1.0 cc	17.6	12.4
In 10.0 cc	36.3	46.1

DIAGRAM Nº 1

1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907

MILLION GALLONS

400
300
200
100
0

Mt PROSPECT & RIDGEWOOD RESERVOIRS CONTENTS

MILLION GALLONS

800
400
0

HEMPSTEAD STORAGE RESERVOIR CONTENTS

MILLION GALLONS

140
130
120
110
100
90
80
70

AVERAGE DAILY CONSUMPTION IN U.S. GALLONS

DEGREES FAHR'T

100
75
50
25
0

TEMPERATURE HEMPSTEAD

RAINFALL HEMPSTEAD

INCHES

10
5
0

YEARLY RAINFALL	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
	38 82"	46 41"	51 22"	43 60"	41 43"	49 92"	51 98"	52 14"	48 62"	36 82"	44 12"	
PROPORTION OF RAINFALL UTILIZED [PUMPED AT RIDGEWOOD]		11 67 - 25 15%	11 99 - 33 41%	12 31 - 28 23%	11 56 - 27 90%	11 75 - 23 54%	12 25 - 23 56%	12 89 - 24 72%	13 62 - 28 42%	15 21 - 41 31%	15 61 - 35 38%	

CITY OF NEW YORK, BOROUGH OF BROOKLYN
DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
DIAGRAM SHOWING
CONTENTS AND CONSUMPTION IN U.S. GALLONS
TOGETHER WITH RAINFALL & TEMPERATURE RECORDS FROM
1896 TO 1906 INCLUSIVE

TO ACCOMPANY ANNUAL REPORT FOR 1906.

Drawn by Stahl
Checked by Harrison & Cook

J. M. McKay
ACTING CHIEF ENGINEER

PLATE Nº 4379 - FILE K-6

TABLE No. 20.

Showing Average Quality of the Water for the Years 1905 and 1906 from the Taps at the Laboratory, from Flushing and Clermont Avenues and from Flatbush Avenue.

	1905.	1906.
Physical Examination.		
Turbidity	4	4
Color	13	10
Per cent. of samples with distinct vegetable odors	0.1	0.3
Per cent. of samples with odors of decomposition	0.6	1.7
Per cent. of samples with odor due to organisms	0.7	2.6
Chemical Examination.		
Albuminoid ammonia	0.061	0.040
Free ammonia	0.012	0.007
Nitrites	0.003	0.003
Nitrates	1.01	1.48
Microscopical Examination.		
Microscopic organisms	1,329	520
Amorphous matter	234	219
Bacteriological Examination.		
Bacteria per c.c.	321	186
Per Cent. of Positive Tests for B. Coli—		
In 0.1 c.c.	2.2	1.7
In 1.0 c.c.	10.0	6.6
In 10.0 c.c.	27.6	32.7

TABLE

Table Showing Results of Tests of High

Streets and Limits.	
Summit street, from Imlay street to India Wharf	
Hamilton avenue, from Imlay street to gate west of Imlay street	
Hamilton avenue and North Pier street, from 12-inch gate west of Imlay street to India Wharf	
Sackett street, from Van Brunt to Hicks street	
Richards street, from Commerce to Verona street	
Richards street, from Commerce to Seabring street	
Richards street, from Seabring to Rapelyea street	
Richards and Woodhull streets, from Rapelyea to Hicks street	
Hicks street, from Woodhull to Carroll street	
Hicks street, from Carroll to President street	
President street, from Columbia to Hicks street	
Hicks street, from President to Sackett street	
Hicks street, from Sackett to Harrison street	
Hicks, Baltic and Henry streets, from Harrison to Congress street	
Sedgwick, Columbia and Degraw streets, from Van Brunt to Hicks street	
Harrison street, from Columbia to Hicks street	
Congress street, from Columbia to Henry street	
Pacific street, from Columbia to Henry street	
Pacific street, from Columbia to River street	
Columbia street, from Congress to Pacific street	
Columbia street, from Congress to Harrison street	
Columbia street, from Pacific to State street	
Van Brunt street, from Sackett to Sedgwick street	
Henry street, from State to north of Joralemon street	
Hicks street, from Degraw to Harrison street	
Van Brunt street, from Sedgwick to Harrison street	
Clinton street, from State to Livingston street	
Henry street, from Joralemon to Pierrepont street	
Henry street, from Pierrepont to Clark street	
Clinton street, from Schermerhorn to Joralemon street	
Van Brunt street, from Sackett to President street	
Pierrepont street, from Hicks to Henry street	

No. 21.

Pressure Fire Service Mains During Year 1906.

Size of Main, Inches.	Length of Main, Feet.	Allowable Leakage, Gallons Per Ten Minutes.	Test Leakage, Gallons Per Ten Minutes.	Linear Feet of Joints.	Per Cent. of Leakage.	Remarks.
12	388	4.77	1.50	171.73	32	
12	550	5.31	4.49	191.10	84	
12	550	5.86	3.74	210.99	64	
12	1,077	12.01	8.23	432.51	69	
16	553	11.29	10.47	406.42	93	
16	328	5.60	3.74	201.57	67	
12 / 16	461	7.67	7.50	272.57	98	
16	879	12.30	9.22	442.93	75	
16	543	7.51	3.75	270.02	50	
16 / 12	808	10.10	3.74	363.61	37	
16	439	6.98	5.24	251.43	75	
16	1,052	16.90	11.97	608.51	71	
16	1,282	17.49	14.25	629.79	81	
12	1,265	13.87	8.98	499.48	65	
12	437	4.42	4.42	159.16	100	
12	974	9.35	4.49	336.65	48	
12	973	9.83	1.49	353.93	15	
12 / 16	752	11.68	5.24	420.48	45	
16	756	12.75	4.50		35	
16	1,114	9.19	6.00	330.76	65	
16	520	0.89	0.90	239.43	100	
12	681	7.04	2.25	263.35	32	
16	689	10.61	7.5	381.96	71	
16	500	8.71	3.00	313.48	34	
12	363	3.81	3.00	137.17	80	
12	827	9.25	5.27	332.99	57	
12	709	6.92	4.49	249.21	65	
12	430	4.86	6.00	699.49	88	Leak in testing apparatus (caught and measured, 1.7 gallons).
16	607	15.05	15.70	541.90	100	Accepted.
20	543	6.47	0.96	232.99	23	

Streets and Limits.
Henry street, from Congress to Pacific street
Henry street, from Pacific to State street
Hicks street, from Remsen to Pierrepont street
Clinton street, from Joralemon to Pierrepont street
Hicks street, from Clark to Orange street
Bridge street, from John to Water street
Pierrepont street, from Henry to Clinton street
Pierrepont street, from Columbia Heights to Hicks street
Clinton street, from Pierrepont to Fulton street
Bridge street, from Johnson to Willoughby street
Henry street, from Middagh to Fulton street
Tillary street, from Bridge to Gold street
Nassau street, from Bridge to Gold street
Prospect street, from Bridge to Gold street
Columbia Heights, from Middagh to Doughty street
Boerum place, from Atlantic avenue to Schermerhorn street
Schermerhorn street, from Court street to Boerum place
Schermerhorn street, from Boerum place to Smith street
Nevins street, from Flatbush avenue to Schermerhorn street
Nevins street, from Schermerhorn street to Atlantic avenue
Schermerhorn street, from Smith to Hoyt street
Johnson street, from Hudson avenue to Gold street
Johnson street, from Hudson avenue to Raymond street
Bridge street, from Prospect to Nassau street
Adams street, from Front to Prospect street
Willoughby street, from St. Edwards street to Hudson avenue
Hoyt street, from Schermerhorn street to Atlantic avenue
Hoyt street, from Schermerhorn to Fulton street
Hudson avenue, from York to Water street
Hudson avenue, from Water to River street
Raymond street, from Johnson to Bolivar street
Bolivar street, from Raymond to St. Edwards street
St. Edwards street, from Bolivar to Willoughby street

Size of Main, Inches.	Length of Main, Feet.	Allowable Leakage, Gallons Per Ten Minutes.	Test Leakage, Gallons Per Ten Minutes.	Linear Feet of Joints.	Per Cent. of Leakage.	Remarks.
16		9.66	8.15	347.76	84	
16	561	9.08	7.50	326.70	64	Leak in testing apparatus (caught and measured, 1.65 gallons).
20	514	11.70	6.00	421.21	51	
12	743	8.49	2.25	305.76	27	
16	548	13.45	8.25	484.04	61	
12	434	4.41	3.00	158.64	68	
20	488	11.72	11.25	421.99	96	
12	500	4.90	4.51	176.44	92	
12	522	5.83	2.27	209.95	39	
12	927	12.67	2.28	456.03	18	
12	545	16.28	14.24	586.08	88	
12	492	5.25	2.94	189.00	56	
12	499	4.50	2.25	162.00	50	
12	513	5.86	2.99	211.00	51	
12	669	9.21	8.93	331.42	97	
12	455	4.70	2.68	169.25	57	
20	592	11.06	10.34	398.17	89	Leak in testing apparatus (caught and measured, 1.5 gallons).
20	451	11.25	9.78	405.00	75	Leak in testing apparatus (caught and measured, 1.35 gallons).
12	467	6.20	4.13	223.20	65	
12	503	6.45	4.35	232.20	69	
20	627	10.73	4.51	386.10	42	
16	602	8.35	3.92	300.52	47	
16	531	8.28	7.50	298.17	73	Leak in testing apparatus (caught and measured, 1.5 gallons).
16	845	18.73	18.75	674.35	88	Leak in testing apparatus (caught and measured, 2.25 gallons).
12	607	6.36	7.50	228.80	88	Leak in testing apparatus (caught and measured, 1.87 gallons).
16	861	11.94	5.24	429.98	44	
12	503	8.33	7.50	299.70	90	
12	475	5.30	9.75	190.58	90	Leak in testing apparatus (caught and measured, 4.95 gallons).
12	515	6.55	5.96	235.66	91	
12	480	5.82	4.77	209.48	82	
16 16 16	803	21.75	15.01	783.00	69	

Streets and Limits.
Jay street, from John to Water street
Jay street, from Water to York street
Main street, from Water to Plymouth street
Bridge street, from Nassau to Chapel street
Duffield street, from Willoughby to Fulton street
Nassau street, from Fulton to Washington street
Nassau street, from Pearl to Washington street
Boerum place, from Fulton to Schermerhorn street, with intersection
Schermerhorn street, from Hoyt to Bond street
Schermerhorn street, from Bond to Nevins street
Fulton street, from Hudson avenue to Raymond street
Johnson street, from Gold to Bridge street
Johnson street, from Bridge to Jay street
Johnson street, from Jay to Washington street
Schermerhorn street, from Nevins street to Third avenue
Atlantic avenue, from Flatbush to Third avenue
Third avenue, from Schermerhorn street to Atlantic avenue
Willoughby street, from Hudson avenue to Gold street
Willoughby street, from Gold to Bridge street
Willoughby street, from Bridge to Jay street
Gold street, from York to Water street
Bridge street, from Prospect to Water street
Gold street, from Water to River street
Washington street, from Tillary to Prospect street
Washington street, from Tillary to Fulton street
Main street, from Water to York street
Bridge street, from Johnson to Chapel street
Fulton street, from Myrtle avenue to Pierrepont stree
Pierrepont street, from Clinton to Fulton street
Adams street, from Johnson to Willoughby street
Hicks street, from Orange to Middagh street
Joralemon street, from Furman street to Willow place
Hicks street, from Pierrepont to Clark street
State street, from Clinton to Court street
Court street, from State to Schermerhorn street

Size of Main. Inches.	Length of Main, Feet.	Allowable Leakage, Gallons Per Ten Minutes.	Test Leakage, Gallons Per Ten Minutes.	Linear Feet of Joints.	Per Cent. of Leakage.	Remarks.
12	464	4.73	4.49	172.78	95	
12	516	5.40	3.02	777.60	56	
12	200	1.08	0.32	38.70	30	
16	456	8.78	4.48	315.90	51	
12	640	6.60	6.10	238.70	91	
12	389	4.13	1.13	123.50	27	
12	536	5.25	4.52	189.00	86	
12	591	17.49	18.75	629.19	95	Leak in testing apparatus (caught and measured, 2.18 gallons).
20	735	10.28	6.75	369.90	47	Leak in testing apparatus (caught and measured, 1.95 gallons).
20	672	10.80	9.75	388.80	83	Leak in testing apparatus (caught and measured, 0.83 gallon).
12	644	9.12	4.50	328.27	50	
20	697	10.25	9.75	369.11	95	
20	539	8.38	5.28	301.57	63	
20	793	15.75	7.50	567.02	48	
20	538	9.98	9.75	359.00	98	
20	935	15.75	11.97	567.00	76	
20	509	10.20	8.25	367.20	88	
16	753	12.68	8.24	456.30	65	
20	521	15.75	8.25	567.15	52	
20	555	9.90	5.25	356.40	53	
12	524	6.45	4.50	232.20	70	
16	475	13.05	12.00	469.80	92	
12	868	9.75	9.65	352.00	99	
16	1,694	26.93	18.00	969.30	67	
20	695	14.18	12.75	510.30	90	
12	555	6.00	6.00	216.00	69	Leak in testing apparatus (caught and measured, 1.87 gallons).
16	845	11.18	9.00	402.30	81	
20 20	789	16.73	12.75	602.10	76	
12	382	4.35	6.75	156.60	86	Leak in testing apparatus (caught and measured, 3 gallons).
12	489	6.08	6.75	218.85	93	Leak in testing apparatus (caught and measured, 1.12 gallons).
20	386	13.28	6.00	477.90	45	
16	705	9.23	3.75	332.20	41	
20 20	937	18.40	15.00	664.66	82	Test accepted.

Department of Water Supply, Gas and Electricity,
Office of Supplies and Accounts, Municipal Building, Room 45,
Brooklyn, February 27, 1907.

Hon. WILLIAM C. COZIER, Deputy Commissioner:

Dear Sir—I beg to transmit herewith for incorporation in report for 1906, the following statements:

A. Amounts available and expenditures during 1906, and balances January 1, 1907.

B. Distribution of expenditures on 1906 accounts.

Respectfully yours,

J. J. FLANNERY, Bookkeeper.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BOROUGH OF BROOKLYN.

Statement Showing Amounts Available and Expenditures During 1906, and Balances January 1, 1907.

Appropriation Accounts.	Amounts Available During 1906.	Expenditures, January 1 to December 31, 1906.		Balances, January 1, 1907.
Lamps and Lighting—				
1903		$26 10		
1904	$665,616 61	228,511 80		$437,104 81
1905	938,886 85	208,385 31		730,501 54
Supplies and Contingencies, 1905	2,704 12	1,711 40		992 92
Rentals of Fire Hydrants, 1905	6,250 00	6,250 00		
Salaries—				
Lighting and Electricity, 1905	435 74	44 77		390 97
Office of Deputy Commissioner, 1906	11,000 00	11,000 00		
Office of Water Registrar, 1906	53,000 00	52,736 64		263 36
Laboratory, 1906	9,800 00	9,576 16		223 84
Lighting and Electricity, 1906	43,910 00	43,376 13		533 87
High Pressure Fire Service Station, 1906	9,023 75	8,645 90		377 85
Supplies and Contingencies, 1906	8,000 00	5,676 26		2,323 74
Rentals of Fire Hydrants, 1906	27,400 00	19,200 00		8,200 00
Lamps and Lighting, 1906	1,086,000 00	598,608 45		487,391 55
Heat and Power for City Departments, County Buildings and Offices, 1906	9,707 65	8,011 10		1,696 55
			$1,201,760 02	

	Amounts Available During 1906.	Expenditures, January 1 to December 31, 1906.		Balances, January 1, 1907.
Water Revenue Accounts.				
Maintenance and Distribution of Water Supply—				
1902	2,042 87	$9 66		2,033 21
1903	3,240 30	374 40		2,865 90
1904	24,516 82	9,339 35		15,177 47
1905	352,796 15	331,888 96		20,907 19
1906	1,744,764 59	1,380,472 41		364,292 18
			1,722,084 78	
Corporate Stock Accounts.				
Water Fund	4,691,577 56	$1,640,141 60		3,051,435 96
Water Main Fund	31,387 23	3,797 51		27,589 72
High Pressure Service	1,156,331 38	607,877 75		548,453 63
			2,251,816 86	
Special Accounts.				
Revenue Bond Fund for Lighting Public Schools, 1904		$10,919 43		
Revenue Bond Fund for Heat and Power for City Departments, County Buildings and Offices, 1906.	7,500 00	1,012 09		6,487 91
Water Meter Fund		2,368 53		
			14,300 05	
Total expenditures			$5,189,961 71	

Distribution of Expenditures.

Maintenance and Distribution of Water Supply, 1906.

	Salaries.	Supplies.
Ridgewood Pumping Station	$209,613 85	$30,827 42
Ridgewood Reservoir	8,573 00	335 62
Mt. Prospect Pumping Station	28,737 28	4,939 30
Mt. Prospect Reservoir	9,761 50	210 80
Gravesend Pumping Station	13,617 20	1,271 97
New Utrecht Pumping Station	11,015 20	615 88
New Lots Pumping Station	15,329 62	2,421 48
Spring Creek Pumping Station	9,756 58	1,565 26
Spring Creek (temporary plant)	2,362 05	32 46

	Salaries.	Supplies.
Oconee Pumping Station	8,369 75	1,577 36
Baiseley's Pumping Station	7,139 87	412 59
Jameco Pumping Station	11,521 62	1,285 59
Springfield Pumping Station	9,308 55	1,075 11
Forest Stream Pumping Station	8,580 90	473 41
Clear Stream Pumping Station	7,778 24	455 50
Watts Pond Pumping Station	7,677 00	321 78
Smith's Pond Pumping Station	7,614 15	518 61
Millburn Pumping Station	30,920 02	4,093 44
Agawam Pumping Station	7,950 94	950 77
Merrick Pumping Station	7,298 75	584 45
Matowa Pumping Station	7,982 40	432 35
Wantagh Pumping Station	7,764 95	332 92
Massapequa Pumping Station	7,872 60	639 42
Engineer's Office	28,578 19	7,901 98
Springfield Filter Plant	1,846 50	378 48
Jameco Filter Plant	2,238 25	1,451 60
Conduits and Reservoirs	66,455 10	7,745 32
Repairs to Buildings	28,874 43	4,898 63
Repairs to Wells	9,149 30	9,243 50
Laboratory	2,768 37	323 36
New Lots Pumping Station (temporary)	3,340 12	2,415 79
Aqueduct Pumping Station	7,586 35	800 86
St. Alban's Pumping Station	9,904 25	1,189 60
Rosedale Pumping Station	7,273 85	932 28
Massapequa Pumping Station (temporary)	1,280 45	13,604 34
Seaford Pumping Station	3,266 50	344 77
Contingencies—Maintenance	222 65	1,600 18
Amityville Pumping Station	1,117 00	1,273 21
Morris Park Pumping Station	93 00	
Taxes		16,333 45
Coal for Pumping		208,956 09
Expressage and Transportation		9,120 03
Queens County Water Company's Contract		28,877 31
Temporary Station—Storage Reservoir		924 96
Telephone Service		3,503 95
Improvement, Jameco Deep Wells		25,105 39
Coney Island High Pressure Station		80 46

	Salaries.	Supplies.
Western District Repair Yard	92,942 56	8,506 16
Eastern District Repair Yard	47,462 60	2,290 06
Coney Island Repair Yard	42,869 81	2,609 09
East New York Repair Yard	40,934 14	2,238 88
Gowanus Pipe Yard	17,865 40	2,640 90
Superintendent's Office	29,555 31	202 80
Tapping		1,876 75
Hydrants, Pipes, etc		14,265 10
Repairs to Pavements		1,015 75
Contingencies—Distribution		3,420 26
Replacing Gates, Hydrants, etc		1,346 22
Bureau of Water Rates	31,037 26	585 83
Office of Supplies and Accounts	12,852 50	
Office of Deputy Commissioner		1,017 67
Total	$936,068 91	$444,403 50

Supplies and Contingencies, 1906.

	Salaries.	Supplies.
Office of Deputy Commissioner		$494 98
Office of Chief Engineer		751 71
Bureau of Water Registrar		1,062 03
Office of Supplies and Accounts		476 78
Bureau of Lamps and Lighting		278 31
Bureau of Electricity and Gas		1,064 28
Mt. Prospect Laboratory		1,315 06
Coney Island High Pressure Station		233 11
Total		$5,676 26

High Pressure Fire Service.

	Salaries.	Supplies.
Central Plant—Mains, etc	$34,399 24	$457,096 44
Central Plant—Joralemon Street Building		12,705 55

	Salaries.	Supplies.
Central Plants—St. Edwards Street Building		7,704 58
Coney Island Plant—Mains, etc		2,521 97
Coney Island Plant—Building		1,439 16
Coney Island Plant—Engines and Pumps		6,767 70
Contingencies	29 75	85,213 36
Total	$34,428 99	$573,448 76

Water Fund.

	Salaries.	Supplies.
Filter Plants	$905 93	$4,020 26
Additional Driven Wells, Stations, etc	4,238 74	36,600 38
Additional Lands	5,732 87	142,847 39
Additional Conduit, 72-inch steel pipe	12,918 23	380,778 34
Test Wells	9,591 40	4,142 39
Water Mains	49,968 17	499,333 40
Substituting new for old pipe	5,471 60	54,262 86
Remodeling Gravesend and New Utrecht Pumping Station	4,255 42	30,260 07
Remodeling Ridgewood Pumping Station, north side	452 44	5,929 65
Remodeling Ridgewood Pumping Station, south side	1,487 01	30,115 20
Remodeling New Lots Pumping Station	2,868 31	47,680 47
Massapequa Infiltration Gallery	10,885 72	186,208 98
Additional Distributing Mains	1,772 56	5,709 25
Hempstead Filters	2,499 50	11,459 74
Temporary Station "X," Rosedale	464 50	13,960 49
Gravesend Wells	4,110 25	4,467 27
Jameco Wells	358 18	4,322 25
New Lots Wells	2,956 25	1,068 60
Canarsie Pumping Station	697 81	1,447 27
New Lots Pumping Station (temporary)		3,014 86
Aqueduct Pumping Station		11,722 67
St. Albans Pumping Station		10,578 93
Massapequa Pumping Station (temporary)		2,233 11
Additional Plant, Oceanee		324 25
Amityville Station		4,515 46

	Salaries.	Supplies.
Seaford Pumping Station		968 58
Morris Park Pumping Station		501 00
Lynbrook Pumping Station		79 00
Woodhaven Pumping Station		60 00
Shetucket Pumping Station (new)		60 00
Baldwins Pumping Station		60 00
Driven Wells		10,774 50
Total	$121,634 89	$1,518,506 71

BUREAU OF WATER RATES.

City of New York, Department of Water Supply, Gas and Electricity,
Bureau of Water Rates,
Brooklyn, January 2, 1907.

Hon. WILLIAM C. COZIER, Deputy Commissioner, Department of Water Supply, Gas and Electricity:

Dear Sir—I have the honor to report the collections of this Bureau for the year ending December 31, 1906, as $2,942,102.82, an increase over the year 1905 of $216,658.73. In addition to the foregoing, the collections of 1906 for water rents for previous years returned to the Department of Arrears for collection, as reported, amount to $248,124.53, making a total collection of water rates for the Borough of Brooklyn for the past year of $3,190,227.35, showing an increase over the previous year of $252,677.48. Attached hereto I beg to submit statement showing receipts in detail, with amounts collected in 1905, for comparison.

The great activity in building in this borough accounts for the large increase in the receipts for regular rents during the year.

During the past year 1,890 water meters were set on permits issued from this office by consumers, an increase of 1,231 over meter settings for 1905. The total number of meters set and in use on December 31, 1906, is 8,896, an increase over December 31, 1905, of 1,724. Statement is attached showing in detail the pattern, size and number of meters set during the year.

The number of permits issued to repair meters during the year was 1,084.

Two thousand three hundred (2,300) notices were sent to property owners to set meters, where conditions required, in compliance with the rules of the Department; 785 of these notices (about 34 per cent.) were complied with and meters set by owners, although the plumbers in this Borough were out on strike from July to October.

In addition to the permits issued to consumers for setting meters, 636 orders were sent to the Department Plumber to install meters on premises where owners failed to comply with the notices to set served upon them. These meters set on Department orders are not included in the detailed statement of new meters.

The meter ledgers in this Bureau have been changed from the old system of Ward divisions to the new system of section divisions, from sections 1 to 11, during the year.

Your attention is again called to the inadequate office space allotted to the Department, the desk room being so contracted that only a small portion of the books can be opened at a time; this causes serious loss of time during the rush season, when issuing bills to consumers on personal application, as a large percentage of the rate bills are issued.

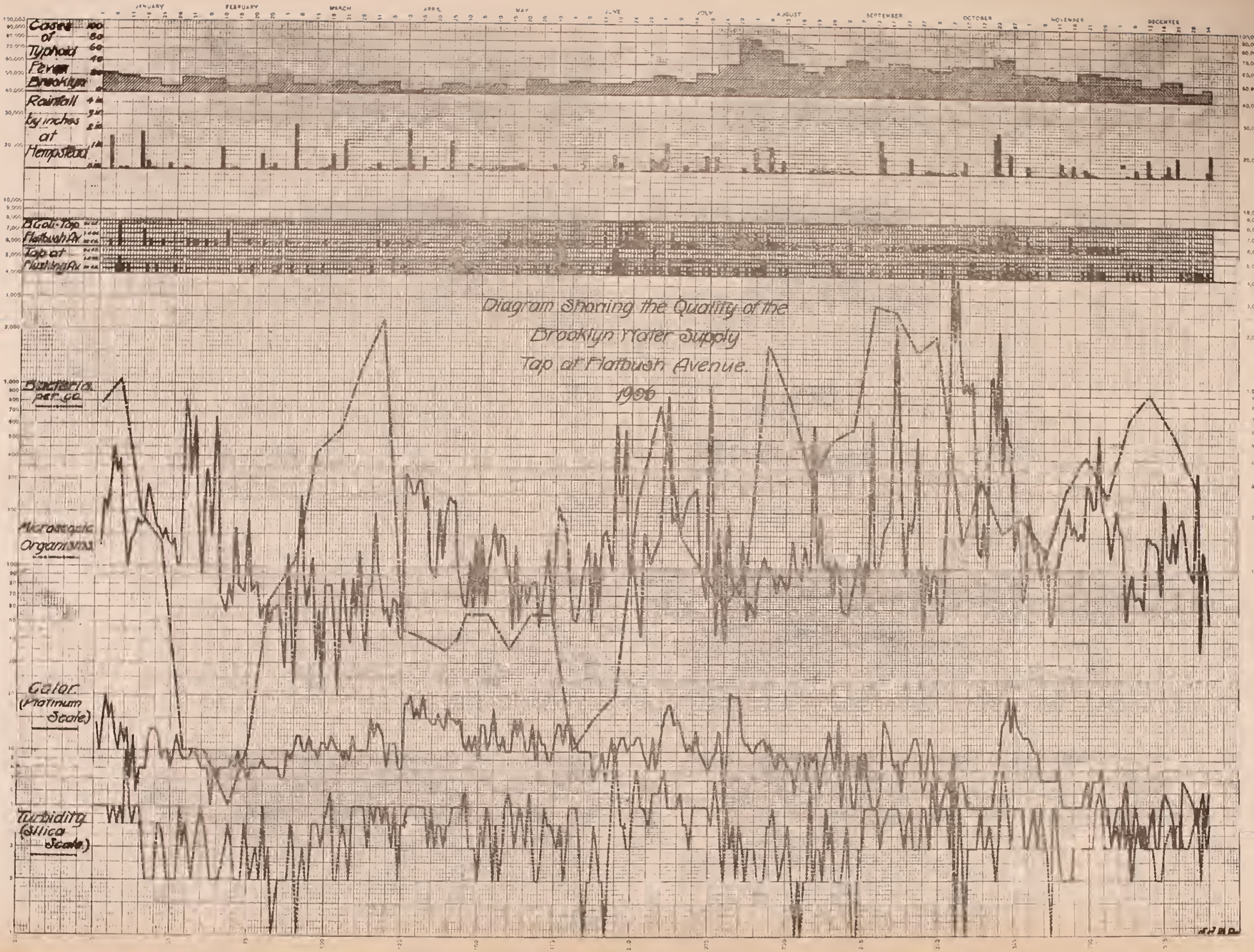
I would also respectfully renew my request for the appointment of more Clerks. Since January 1, 1904, the clerical force has been reduced by eight, due to losses by death, resignation and transfer. Three Clerks have been transferred to this office during the interim, making a net loss of five Clerks, while the necessary work of the office is increasing every year.

The storage room for old records of the Bureau is also much too small, books and records being stacked over all the available floor space, making it necessary, in the examination of these old records, to take down and replace many books, a needless waste of time and labor.

Application has been made to the Bureau of Public Buildings and Offices for the addition to this office of the rooms now occupied by the Department of Arrears, which I understand is to remove to new quarters in the near future. This additional office space will facilitate the work of this office, as it will give us sufficient desk room, a large vault on the main floor for storing the cash books and records, double the storage space in the basement and give a direct entrance to the storage room from the main office instead of as at present from a public hall and not connected with the office.

Should this additional space be assigned to this Bureau, I would respectfully recommend that the issuing of permits for taps and connections and building purposes, as well as the initial inspection of meter settings, be transferred to this Department from the Engineer's Bureau.

Recommendation is respectfully made that the Borough be divided into inspection districts, as per my letter to Commissioner Ellison under date of March 19, 1906, and the placing of a competent Inspector in charge of each district, holding him personally responsible for the proper charge for water rents, the detection of leaks and waste of water, as the inspection could in this way be made thorough and practically continuous. Should such additional inspection districts be approved, I would suggest the appointment of plumbers as Inspectors, who could, on the failure of


Diagram Showing the Quality of the
Brooklyn Water Supply
Tap at Flatbush Avenue.
1906
Cases of Typhoid Fever Brooklyn
Rainfall in inches at Hempstead
Tap at Flatbush Av
Tap at Flushing Av
Bacteria per cc.
Microscopic Organisms
Color (Platinum Scale)
Turbidity (Silica Scale)
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

owners to stop leaks, etc., after notification by the Department, make the necessary minor repairs, the expense of which could be charged on the books of this office against the property.

Your attention is respectfully called to the fact that it has been impossible to seal the meters set prior to my incumbency, in accordance with the order from the Commissioner, as the force of Inspectors has been so reduced by the detailing of twenty (20) of our men for duty in the office of the Water Register in Manhattan. Seals, etc., however, have been prepared ready for use.

In February last twenty-two Inspectors from this office were detailed by order of Commissioner Ellison for duty in Manhattan; from time to time seven of these have been returned to Brooklyn, but fifteen are still in New York. The salaries of these Inspectors, during their service in Manhattan, up to December 31, 1906, amount as follows:

From salaries, office of Water Registrar	$5,245 66
From water revenue, office of Water Registrar	10,182 27
Total	$15,427 93

—all of which has been paid from the appropriation for this Bureau.

The loss of the services of these Inspectors hereinbefore referred to has seriously handicapped the work of this Bureau, as it has been impossible with the force of Inspectors available to properly inspect the Borough for new buildings and alterations.

Respectfully,

WM. R. McGUIRE, Water Registrar.

	Regular.	Meters.
January	$15,910 99	$87,525 26
February	11,651 39	31,841 26
March	15,195 84	23,514 22
April	15,094 75	167,695 28
May	411,405 76	98,593 26
June	350,956 53	88,965 74
July	703,303 99	71,381 19
August	106,796 11	41,190 16
September	40,549 71	17,568 17
..	108,531 01	191,321 57
November	28,593 13	108,509 94
December	21,099 55	54,543 99
Total	$1,829,088 76	$982,650 04
1905	1,698,479 26	905,086 63
Increase	$130,609 50	$77,563 41
Decrease		

Penalty.	Building.	Labor and Material.	Taps.	Meter Settings.	Total.
$1,938 66	$4,251 70	$40 47	$1,044 25		$110,711 33
1,295 12	4,781 98	127 32	865 75		50,562 82
1,854 55	6,523 00	138 77	1,856 25		49,082 63
1,650 93	6,056 60	127 03	2,194 00		192,818 59
2,350 90	8,637 40	1,784 85	2,100 50		524,872 67
2,066 43	5,994 15	393 79	2,783 50		451,160 14
2,227 24	7,877 94	76 11	1,572 75		786,439 22
3,232 79	5,389 40	237 83	2,288 50		159,134 79
1,851 71	4,937 70	156 91	1,912 50		66,976 70
5,163 76	5,890 60	105 54	2,158 75		313,171 23
3,521 15	5,130 55	401 28	2,403 50		148,559 55
2,499 44	3,744 90	5,094 45	1,309 50	$321 32	88,613 15
$29,652 68	$69,215 92	$8,684 35	$22,489 75	$321 32	$2,942,102 82
26,832 56	64,555 75	7,626 39	22,863 50		2,725,444 09
$2,820 12	$4,660 17	$1,057 96		$321 32	$216,658 73
.....			$373 75		

1906—		
Reported by Department of Taxes	$114,523 66	
Reported by Department of Arrears	133,463 08	
Reported by Borough of Queens	137 79	
		$248,124 53
1905—		
Reported by Department of Taxes	$82,907 61	
Reported by Department of Arrears	129,198 17	
		212,105 78
		$36,018 75

Statement of Settings, Discontinuances and Meters in Use.

Meter Settings.

	⅝-inch.	¾-inch.	1-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.	Total.
Worthington	187	26	51	22	55	13	10	6	370
Thomson	590	103	165	81	45	6	5	..	995
Trident	249	33	65	30	26	8	5	1	417
Crown	32	3	4	2	3	..	1	1	46
Nash	13	5	8	..	1	..	..	..	27
Standard	13	2	2	2	5	3	1	..	28
Hersey	2	2	1	2	..	..	..	..	7
Total	1,086	174	296	139	135	30	22	8	1,890

Meters in use December 31, 1905		7,172
Meters set during 1906	1,890	
Meters discontinued during 1906	166	
Net increase		1,724
Meters in use December 31, 1906		8,896

Brooklyn, January 22, 1907.

Hon. WILLIAM C. COZIER, Deputy Commissioner, Department of Water Supply, Gas and Electricity, Borough of Brooklyn:

Dear Sir—In presenting herewith the annual schedule of operations of the Bureau of Electricity and Gas, I beg to submit the following report for the year 1906:

Testing of Gas.

Our Bureau has been relieved of the duty of testing illuminating gas, which responsibility has been assumed by the Chief Engineer of Light and Power.

Electric Meters.

Under an agreement which exists between The City of New York and Columbia University the laboratory of the latter and its experts are employed for testing such electric meters as form the subject of complaint. The new method of dealing with these complaints bids fair to prove very successful. It conduces to greater accuracy and is more convenient.

Interior Conductors.

This Bureau is charged with the duty of inspecting all electrical appliances or wiring introduced into buildings in this Borough; the reinspection of old electric equipments and the investigation of all fires whose origin might be attributable to electricity. For this purpose we have a force of nine (9) inspectors—a sufficient number to care fairly well for the new work. We operate under rules promulgated by the Commissioner and based generally upon the National Electric Code.

In addition to the purely routine work special Monday inspections are made of electrical features used on the stages of our various theatres.

Last spring I submitted for consideration the question of establishing in the Fire Department a special theatre squad, to be trained in the electrical rules and regulations of our department, and to act in lieu of our own inspectors in matters relating to temporary stage electric lighting. A fireman is in attendance at each performance, whereas it is possible for our inspector to visit each theatre only once a week.

For several years past I have advocated that "a systematic canvass and resurvey of all old electric equipments in the borough should be undertaken at once, and should become a permanent feature of our work, the routine being so arranged that each equipment might come under our observation once every two or three years. This would require an increase in our inspection force, but it is fully as important to see that electrical appliances and wiring are properly maintained as to supervise their correct installation. Increasing vigilance must be exerted as equipments grow older—and some of them are now eighteen or twenty years old."

Owing to the somewhat laborious method of procedure laid down by the Charter for securing compliance with our requirements we have preferred to deal with dangerous electrical installations through the operating companies or the fire marshal. In case a defective installation is connected to the mains of a public service corporation we serve peremptory orders on the corporation to discontinue service. Where the installation is independent and supplied from its own generating plant the aid of the fire marshal is invoked successfully.

One of the most important instances in which the correction of electrical defects was forced is to be found in a large factory employing several thousand persons, the

majority of whom are women. This contained a private plant, and the wiring and appliances could hardly have been in worse condition. Repeated notices to the owners brought no results; but our representation of the case to the fire marshal secured within thirty-six hours a promise from the owners to overhaul the plant at once, and within four days four wiremen were at work making the alterations directed by this Department.

In nearly all of these inspections we are duplicating the work of the Fire Underwriters, for whose inspections a fee is charged. This condition imposes a double tax and a double nuisance upon the householder, and it is hoped that the day may come when a single inspection—one by the City—will be sufficient. To that end we are endeavoring to make our inspections more able, more conscientious and more uniform, so that at least they may command the entire confidence of the Fire Underwriters.

The time of one inspector is given to overhead lines.

Overhead Wires.

Year after year I have had to report that "Brooklyn is cursed with an immense mass of overhead conductors of all classes interwoven in all kinds of shapes. This is the outgrowth of years of construction—much of it without proper official supervision—and we are endeavoring continually to bring about better conditions, either through the burial of wires or through the rearrangement of pole lines."

"A large field of usefulness awaits here in Brooklyn the advent of a pole chopping gang similar to the one that made electrical history for old New York some twenty years ago."

It has been found to be utterly impracticable to secure results of any importance in the removal of poles and wires from our highways, owing to the fact that the fire and police telegraph lines are constructed and maintained by their respective departments. Under the present Charter three large city departments must work in absolute harmony in this matter of poles and wires, which is one of secondary interest to two of the departments.

Our records show that after seven years of effort, under varying administrations, the proper degree of harmony cannot be attained; and I am very firmly convinced that the construction and maintenance of all outside fire and police signal lines should be placed in charge of the Department of Water Supply, Gas and Electricity. The ridiculously poor showing which this Department is making from year to year in the matter of removing or reconstructing pole lines is due, not to the public service corporations, not to lack of interest or energy on the part of this Department, but solely to the City itself as represented by the Fire and Police Departments.

Pole Lines.

Many years must elapse before poles carrying electrical wires cease to exist in the Borough. At best these poles are unsightly obstructions and tend to impair the

value of abutting property. This is particularly true of those poles owned by the City, which are never painted and compare unfavorably with the poles of the public service corporations. It has been found to be impossible to secure the construction of pole lines under private ownership, with a view to the future and general needs of the district instead of to the immediate and special needs of the corporation undertaking the construction. At present several poles of different ownership must be allowed, where, under public ownership, one pole might be made to serve.

Subways.

Our present method of dealing with the electrical subway situation seems not to be giving the best possible results. In Manhattan and the Bronx, where public subway companies exist, it is reported that these companies are controlled by the public service corporations. In Brooklyn, Queens and Richmond, where each corporation is allowed to construct its own subway, there is more or less of a scramble to secure a choice location in already congested streets. All this operates to waste the space beneath our highways, to increase the number of street openings and to retard extensions in those cases where an immediate return on the investment cannot be anticipated.

Third Rail.

After seven years' careful attention to the performance of the exposed third rail used on the elevated roads of the Borough, it has been decided that the comparatively small element of danger which it introduces is not of sufficient importance to warrant, at present, the entire reconstruction of the rail and contact shoes and the partial rebuilding of the structure, which would be necessary if proper rail protection were to be provided.

Subsurface Construction Maps.

The Bureau having charge of the issuing of gas, steam, pneumatic and electric permits should have adequate authority and funds for preparing accurate maps of subsurface construction. At present the Borough President, who cannot initiate a single permit for any one of these purposes, is attempting to carry out the scheme of mapping undertaken by this Department three years ago.

I have prepared several special reports on the subject of these maps, and have exhibited the maps themselves in various official quarters; but it seems utterly impossible to enlist the active interest of those who have power to inaugurate the scheme in a comprehensive manner, notwithstanding the fact that the plan, which I have borrowed largely from Philadelphia, promises beyond question to be not only self-supporting within a year or two, but a source of revenue.

Electrolysis.

During this year this Bureau has not been called upon to make any investigation of the corrosion of underground metals, nor have we initiated any such investigation, owing to the fact that the entire redistribution of the feeding system of the Brooklyn

Rapid Transit Company was in progress, together with the entire reconstruction of their track and return system.

The Electric Code.

It is very important that the electrical rules and regulations of this Department should be embodied in an electrical code of The City of New York. Such a codification had been progressing under the supervision of our Consulting Electrical Engineer, when, last year, the revision of the National Electric Code was considered seriously. Much as we need an electrical ordinance, it would apparently be unwise to secure the adoption of one prior to the presentation of a report by the National Electric Code Revision Committee.

Licensing Electricians.

I beg to repeat here my annual recommendation in regard to licensing:

"There are some electrical workers and contractors, I regret to say, who, either through intent or ignorance, vitiate to some extent the good accomplished by our inspection. Many of these persons may be brought into line through the operations of the proposed Electric Code. However, the penalty attached to the code would be no assurance against incompetency; nor would it prove a bar to rascality in cases where payment of a non-cumulative fine would be cheaper than compliance with our requirements. The system of licensing would tend to weed out the ignorant and deter the vicious. I earnestly urge the adoption of such a system, applied either to the contractor or to the worker, or to both, as may be deemed expedient."

Municipal Ownership.

Reverting to those portions of my report treating of subways and pole lines, I beg to say that I can see no relief save in municipal ownership of subways and poles from the present intolerable conditions. Under municipal ownership it would be possible to reconstruct or remove the present pole lines and subways, or to make extensions of the same according to a comprehensive plan under which more regard would be given to the needs of the public and less to the financial convenience of the individual corporations.

The Office.

The addition of two Clerks to our office force has enabled us to keep fairly well abreast of the current work. Our quarters, however, are still ridiculously inadequate—not to say scandalous—and were it not for the fact that we are able to store many of our records in two large cases in the public corridor it would be impossible to carry on our work with even an approach to reasonable dispatch.

The total number of applications for permits and certificates during 1906 is 29,898. This means an increase all along the line amounting to 44 per cent. Analysis gives the following percentages of increase:

For overhead permits, per cent	47
For subway permits, per cent	83
For subway subsidiary permits, per cent	27
For underground conductor permits, per cent	66
For certificates of interior wiring, per cent	37

The total number of inspections made during the year was 37,057, representing an increase of 34 per cent. over the previous year. On the other hand, the number of complaints is 1,885, or 9 per cent. less than a year ago. This seems to show a very decided improvement in the electrical conditions throughout the Borough.

It is interesting to note that the percentage of increase in subway permits is very much in excess of that of pole and overhead wire permits, viz., 83 per cent. against 47 per cent. These figures indicate progress in the right direction.

Permit me to call attention to the creditable work of my subordinates.

Recommendations.

To recapitulate then, I beg to invite your attention to the following recommendations:

1. An increase in the force of Inspectors to care for resurveys of electrical installations.
2. The placing of the outside lines of the fire and police telegraph systems in the hands of this Department.
3. The municipal ownership of poles and subways.
4. The proper inauguration of a comprehensive system of subsurface maps.
5. The adoption of an electric code in the near future.
6. The licensing of electricians.
7. The providing of suitable quarters for this Bureau.

Respectfully,

H. S. WYNKOOP, Electrical Engineer.

Applications brought forward	
Applications received	
Applications refused	
Applications pending	
Permits or certificates granted	

Companies.	Distribution and Classification of Permits.			
	Poles and Overhead Wires.	Subways.	Subway Subsidiaries.	Underground Conductors.
Brooklyn Borough Gas Company			39	
Brooklyn Heights Railroad Company	200	17	13	13
Brooklyn and Rockaway Beach Railroad Company	2			
Brooklyn Union Gas Company			125	
Coney Island and Brooklyn Railroad	7	1	4	4
Edison Electric Illuminating Company	3,755	816	1,396	1,905
Flatbush Gas Company	204	26	174	172
Kings County Lighting Company			52	
Long Island Railroad Company				
New York and Long Island Traction Company	1			
New York and New Jersey Telephone Company	8,822	73	409	581
Postal Telegraph and Cable Company	3			
Stock Quotation Telegraph Company	11			
Western Union Telegraph Company	38			
Board of Education	1	1	5	4
Fire Department	46		42	
Police Department	2		4	
Abraham & Straus			1	
Charles E. Ring		1		1
C. H. Offerman and others		1		
Jno. Pirkl Iron Works		1		1
Young Men's Christian Association	1			
New York Mail and Newspaper Transportation Company			1	
Total	13,093	937	2,265	2,681

*Discontinued by the Local Bureau on January 30, and placed in charge of a Central Bureau.

ITY, BUREAU OF ELECTRICITY AND GAS, BROOKLYN.

1906, January 1 to December 31.

Poles and Overhead Wires.	Subways.	Subway Subsidiaries.	Underground Conductors.	Interior Wiring.	Total.
.....					
13,281	954	2,239	2,686	10,738	29,898
188	17		5	756	940
13,093	937	2,265	2,681	9,982	28,958

Operations.						
Poles Erected.	Poles Removed.	Overhead Wires Removed, Miles.	Subway Constructed, Miles.	Subway Duct Laid, Miles.	Conductors Placed in Subways, Miles.	Gas Main Laid, Miles.
....						4.087
1,793	1,133	40.135	8.385	58.885	56.64	
....						
....						20.13
4	1	9.50			5.00	
924	641	35.21	10.97	99.95	163.28	
46	6	.02	3.41	15.55	9.43	7.65
....						4.30
....					.10	
....						
198	407	507.72	15.376	109.736	38,572.71	
....						
....		11.				
16	20					
....						
71	43	13.				
....	7	5.		1.50	456.50	
....						
....						
....						
....						
....						
....						
3,052	2,258	621.585	38.141	285.621	39,263.66	36.167

Appliances Inspected.

Incandescent lamps	247,509
Arc lamps	1,731
Motors (horse power, 9,004.43)	2,445
Generators (kilowatts, 5,580.23)	75
Services	2,053
Inspections interior wiring	37,057
Complaints sent out	1,885
*Photometric tests of gas	19

H. S. WYNKOOP, Electrical Engineer.

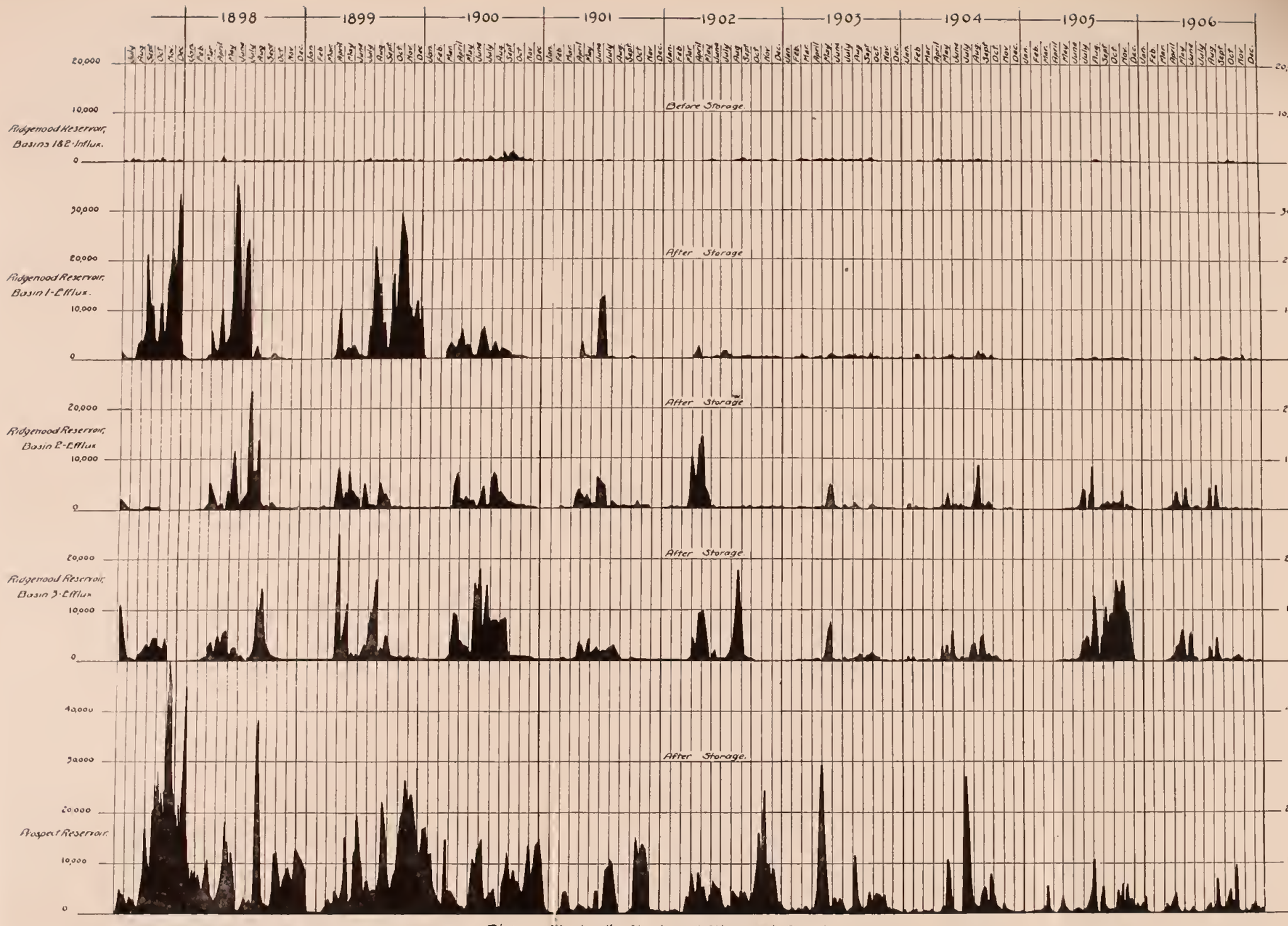


Diagram showing the Number of Microscopic Organisms
Before and After Storage in the
Distribution Reservoirs of the Brooklyn Water Supply.
From July 1897 to Dec. 1906.

S.d.B.

III.

BUREAU OF WATER REGISTER.

BOROUGH OF MANHATTAN.
Department of Water Supply, Gas and Electricity,
Bureau of Water Register,
New York, January 17, 1907.

Hon. JOHN H. O'BRIEN, Commissioner of Water Supply, Gas and Electricity:

Sir—I have the honor to submit herewith a detailed statement of the receipts of this Bureau for the year ending December 31, 1906, and respectfully beg to call your attention to the following facts:

The receipts for the year are $5,909,327.88, being the largest in the history of the Department. They constitute a total increase of $554,572.66, over the receipts of the year 1905.

In the Regular Rate Branch there is an increase of $136,828.91.

In the Meter Branch there is an increase of $396,383.70.

The receipts for extras, viz., boilers, concrete, and wetting down buildings, show an increase of $15,618.06, a gain of 446 per cent.

The receipts for water supplied to tugs, etc., show an increase of $16,457.29.

During the year there were 8,507 new meters installed; nearly four times as many as during the year 1905.

The general reinspection of buildings will be continued as rapidly as possible until every unmetered building has been examined, and meters placed in all buildings requiring same, as provided for by section 475 of the Greater New York Charter.

Particular attention has been given to the subject of waste, and all complaints relating thereto have been promptly investigated and acted upon.

The issuance from this Borough of all permits for water to be supplied to shipping in the entire City, has proved a great success, has increased the revenue and facilitated the collection thereof, with less cost to the City.

When the patrol boat for which the Board of Aldermen recently made an appropriation, has been placed in commission, the revenue derived from this source will be greatly increased.

I feel confident that with an increased force and additional office room, a greater increase in revenue will result for the ensuing year.

Respectfully,

M. C. PADDEN, Water Register.

BUREAU OF WATER REGISTER.

Department of Water Supply, Gas and Electricity,
Bureau of Water Register, Borough of Manhattan,
New York, January 17, 1907.

Hon. JOHN H. O'BRIEN, Commissioner of Water Supply, Gas and Electricity:

Sir—I have the honor to submit a statement of moneys received in this Bureau for the year ending December 31, 1906, and placed to the credit of the respective accounts with the City Chamberlain, together with the accounts returned to the Bureau of Arrears:

Regular Rates.

	Penalties.	Principal.	Total.
Quarter ending March 31	$3,159 42	$29,814 22	$32,973 64
Quarter ending June 30	3,324 31	779,847 28	783,171 59
Quarter ending September 30	5,096 85	1,221,871 62	1,226,968 47
Quarter ending December 31	8,888 02	152,650 59	161,538 61
	$20,468 60	$2,184,183 71	$2,204,652 31
Meter Measurement—			
Meters, Exclusive of Steamboat Meters.			
Quarter ending March 31		$656,903 82	
Quarter ending June 30		820,525 60	
Quarter ending September 30		779,502 46	
Quarter ending December 31		1,151,419 62	
			3,408,351 50
Steamboat Meters—			
Quarter ending March 31		$21,331 90	
Quarter ending June 30		42,837 70	
Quarter ending September 30		29,838 90	
Quarter ending December 31		52,756 80	
			146,765 30
Building Purposes—			
Quarter ending March 31		$13,117 98	
Quarter ending June 30		17,309 37	
Quarter ending September 30		13,530 10	
Quarter ending December 31		8,501 19	
			52,458 64
Permits issued, 964.			

	Principal.	Total.
Extras, Boilers, etc.—		
Quarter ending March 31	$4,103 67	
Quarter ending June 30	6,040 80	
Quarter ending September 30	4,553 35	
Quarter ending December 31	4,420 36	
		19,118 18
Permits issued, 999.		
Tugs—		
Quarter ending March 31	$5,403 75	
Quarter ending June 30	16,963 54	
Quarter ending September 30	5,452 50	
Quarter ending December 31	12,885 00	
		40,704 79
Permits issued, 1,033.		
Taps—		
Quarter ending March 31	$1,640 00	
Quarter ending June 30	2,155 50	
Quarter ending September 30	1,808 50	
Quarter ending December 31	1,303 00	
		6,907 00
Taps issued, 1,353.		
Meter Setting Fund No. 2—		
Quarter ending March 31	$3,629 25	
Quarter ending June 30	4,047 89	
Quarter ending September 30	2,692 37	
Quarter ending December 31	5,558 09	
		15,927 60
Repairs, etc. (Bureau of Chief Engineer)—		
Quarter ending March 31	$552 13	
Quarter ending June 30	1,901 09	
Quarter ending September 30	398 03	
Quarter ending December 31	2,258 56	
		5,109 81
Street Sprinkling—		
Quarter ending March 31	$1,333 25	
Quarter ending June 30	2,666 50	
Quarter ending September 30	3,999 75	
Quarter ending December 31	1,333 25	
		9,332 75
Total		$5,909,327 88
Returned to Bureau of Arrears—		
Regular rates	$92,915 80	
Meter measurement	178,872 23	
Meter Setting Fund No. 2	19,308 37	
The total amount collected during the year 1905 was		5,354,755 22
—which shows an increase of		$554,572 66

Respectfully submitted,
M. C. PADDEN, Water Register.

IV.

BUREAU OF WATER REGISTER.

BOROUGH OF THE BRONX.

Department of Water Supply, Gas and Electricity,
Bureau of Water Register,
Third Avenue and One Hundred and Seventy-seventh Street,
New York, January 29, 1907.

Hon. JOHN H. O'BRIEN, Commissioner, Department of Water Supply, Gas and Electricity, Nos. 13 to 21 Park Row, New York City:

Dear Sir—I herewith transmit the annual report, showing receipts for water rents in the Borough of The Bronx for the year 1906, as follows:

Month.	Rates.	Penalty.	Meters.	Builders' Permits.	Extras.	Taps.	M. S.	Total.
January	$4,191 45	$459 61	$23,693 05	$1,441 99	$433 40	$615 50	$178 94	$30,219 50
February	3,195 20	327 70	11,877 20	2,257 35	267 50	383 50	361 61	17,924 95
March	2,899 90	320 90	13,649 05	3,879 05	736 00	633 00	422 73	21,484 90
April	4,910 10	467 85	22,802 65	4,378 35	992 75	1,083 00	246 31	33,551 70
May	86,401 30	531 47	11,923 85	3,333 60	530 00	1,137 00	1,142 19	102,720 22
June	74,875 05	440 64	12,807 60	3,512 60	797 15	843 50	226 65	92,433 04
July	191,733 56	740 82	19,923 05	2,876 50	964 90	995 00	128 47	216,238 83
August	17,981 80	735 50	27,959 40	2,199 58	609 95	741 00	36 80	49,410 23
September	9,104 95	403 35	7,813 30	1,610 25	483 62	777 50		19,415 47
October	26,661 90	1,111 98	20,720 65	1,314 95	745 45	967 50	229 04	50,554 93
November	9,106 10	592 50	22,330 80	1,770 00	481 25	910 00	25 43	34,680 65
December	6,820 75	735 46	20,364 15	654 50	362 31	494 50	228 96	38,937 17
Total						$9,581 00	$3,227 22	$707,571 59
For taps								9,581 00
For M. S.								3,227 22
Full total								$720,379 81

Respectfully submitted,

(Signed) THOMAS M. LYNCH, Water Register.

V.

Department of Water Supply, Gas and Electricity,
Borough of Queens,
Long Island City, January 9, 1907.

JOHN H. O'BRIEN, Esq., Commissioner, Nos. 13 to 21 Park Row, New York City:

Dear Sir—The following is statement of water rents and charges collected and deposited during the year ending December 31, 1906:

Annual frontage and extra rates	$61,562 79
Penalties on deferred payments of annual rates	1,417 25
Meter rates for water supplied to buildings	123,265 23
Charges for water supplied for building purposes	5,008 02
Charges for water supplied for miscellaneous purposes	499 25
Charges for permits to tap mains	3,094 00
Total receipts for the year	$194,846 54
Arrears—Amounts returned to Bureau of Arrears	26,082 09
Total revenue for the year	$220,928 63
Increase in revenue over the year 1905	$31,713 18

Yours very respectfully,
CHARLES C. WISSEL,
Deputy Commissioner, Queens.

Department of Water Supply, Gas and Electricity,
Borough of Queens,
Long Island City, January 21, 1907.

Hon. JOHN H. O'BRIEN, Commissioner of Water Supply, Gas and Electricity, Nos. 13 to 21 Park Row, New York City:

Dear Sir—I herewith forward to you report of electrical transactions with duplicate for the year 1906.

Yours very respectfully,
CHARLES C. WISSEL,
Deputy Commissioner, Queens.

Department of Water Supply, Gas and Electricity,
Borough of Queens,
Long Island City, January 21, 1907.

Hon. CHARLES C. WISSEL, Depupty Commissioner, Queens, Long Island City, N. Y.:

Dear Sir—I herewith submit to you report of the Electrical Bureau, Borough of Queens, for the year 1906, together with comparison sheets for the years 1904, 1905 and 1906, and in connection with same beg to call attention to the following facts:

First—That the increase of 1906 is about equal to the total of 1904.

Second—That the first three quarters of 1906 exceed the total of 1905.

Third—That this mass of business has been transacted by the Bureau with no increase of force since 1901.

Fourth—That there were no subways prior to 1898. Since then there have been constructed as follows:

Trench, feet	213,264
Duct, feet	1,589,085
Cable, feet	413,649.4
Conductors, miles	21,776.07
Trench, miles	40.39
Duct, miles	300.96
Cable, miles	81.75

Fifth—That the increase of business necessitates an increased force of Inspectors, as the present force cannot cover the territory and handle satisfactorily the business of the Bureau.

The Bureau repeatedly receives complaints that enough inspections cannot be had on work under construction, thus delaying the work and causing loss of time and money to the owners and tenants of buildings.

Respectfully yours,
J. H. BURKE, Chief Inspector.

The following is a summary of electrical transactions of the Borough of Queens for the years 1904, 1905 and 1906, showing increase.

Permits Granted for Exterior Work.

	1904.	1905.	1906.
For telephone and signal	1,033	2,334	3,507
For electric light and power	801	1,011	1,742
Total	1,834	3,345	5,249

Applications Received and Certificates Granted for Interior Work.

	1904.	1905.	1906.
Applications received	1,102	1,257	2,164
Certificates granted	953	1,050	1,741
Incandescent lights	36,886	39,724	59,098
Arc lights	264	161	271
Motors (horse power)	673.6	12,407.56	2,125.75
Generators (K. W.)	308.07	9,926.6	18,639.65

Complaints.

	1904.	1905.	1906.
Complaints issued	570	494	730
Complaints attended to	577	493	694

Poles and Wires Removed.

	1904.	1905.	1906.
Poles	154	64	48
Wires (miles)	112.8	40.96	174.14

Underground Construction During the Years 1904, 1905 and 1906, and Total Construction Since Consolidation, 1898.

	Feet of Trench.	Feet of Duct.	Feet of Cable.	Miles of Conductors.	Miles of Trench.	Miles of Duct.	Miles of Cable.
1904	5,917	49,103	16,464	502.19	1.13	9.30	3.112
1905	49,071	547,458	138,475	4,044.66	9.30	103.67	26.226
1906	53,446	459,545	156,883	10,370.87	10.15	87.07	29.73
Total	108,434	1,056,106	311,822	14,917.72	20.58	200.04	59.068
Totals from 1898 to 1907	213,264	1,589,085	431,649.4	21,776.07	40.39	300.96	81.75

Permits Granted for Exterior Work.

Company.	Quarters. First.	Second.	Third.	Fourth.	Total.
Long Island Electric Railway Company	..	1	3	..	4
New York and New Jersey Telephone Company.	611	1,169	640	758	3,178
New York and Queens Electric Light and Power Company	328	285	323	309	1,245
Long Island Railroad Company	9	1	1	..	11
Queens Borough Gas and Electric Company	7	40	66	26	139
New York and Queens County Railway Company	4	10	2	16	32
Brooklyn Heights Railroad Company	2	4	..	..	6
Department of Education	2	..	..	..	2
Brooklyn, Queens County and Suburban Railroad Company	..	2	3	3	8
Bowery Bay Electric Light and Power Company.	..	3	..	..	3
Western Union Telegraph Company	.	1	3	5	9
Department of Water Supply, Gas and Electricity	..	2	..	..	2
Postal Telegraph and Cable Company	..	3	..	1	4
Fire Department	..	4	1	105	110
New York and Long Island Traction Company	..	1	..	1	2
Manhattan Fire Alarm Company	.	1	..	..	1
Ocean Electric Railway Company	..	..	..	1	1
Total	963	1,527	1,042	1,225	4,757
Subways—					
New York and New Jersey Telephone Company	14	3	13	4	34
New York and Queens County Railway Company	..	5	..	5	10
Long Island Railroad Company	.	1	..	..	1
New York and Queens Electric Light and Power Company	..	1	2	9	12
Fire Department	..	..	..	1	1
Brooklyn, Queens County and Suburban Railroad Company	..	2	..	1	3
Brooklyn Heights Railroad Company	..	..	..	5	5
Subsidiaries—					
New York and New Jersey Telephone Company	9	15	18	14	56
New York and Queens Electric Light and Power Company	5	10	14	165	194
Board of Education	1	..	..	..	1
Queens Borough Gas and Electric Company.	..	1	..	..	1
New York and Queens County Railway Company	..	..	..	1	1
Fire Department	..	..	..	9	9

Company.	Quarters. First.	Second.	Third.	Fourth.	Total.
Conductors—					
New York and Queens Electric Light and Power Company	6	11	15	17	49
Long Island Railroad Company	2	..	1	..	3
New York and New Jersey Telephone Company	9	31	27	25	92
New York and Queens County Railway Company	..	2	..	..	2
Brooklyn, Queens County and Suburban Railroad Company	..	..	..	10	10
Fire Department	..	..	..	8	8
Total	1,009	1,609	1,132	1,499	5,249

Underground Construction.

Company.	Feet of Trench.	Feet of Duct.	Feet of Cable.	Miles of Conductors.	Miles of Trench.	Miles of Duct.	Miles of Cable.
Low Tension.							
New York and New Jersey Telephone Company	32,026	275,157	136,105	10,360.06	6.07	52.12	25.78
High Tension.							
Brooklyn Heights Railroad Company	3,322	37,803			.63	7.16	
New York and Queens County Railway Company	1,365	8,112	4,035	1.28	.26	1.54	.77
Brooklyn, Queens County and Suburban Railroad Company	11,513	114,438	12,219	6.66	2.19	21.68	2.32
New York and Queens Electric Light and Power Company.	4,070	17,962	2,100	1.50	.78	3.41	.40
Long Island Railroad Company.	1,150	6,073	2,424	1.37	.22	1.16	.46
Total	53,446	459,545	156,883	10,370.87	10.15	87.07	29.73

For What Purpose.

	Quarters. First.	Second.	Third.	Fourth.	Total.
Erect poles	6	12	10	38	66
Erect poles and wires	78	82	77	50	287

	Quarters.				Total.
	First.	Second.	Third.	Fourth.	
Erect poles, wires and city lamps	4	5	106	36	151
Erect guy stubs	3	4	4	1	12
Replace poles and wires	67	56	63	46	232
Replace poles, wires and city lamps	4	..	2	4	10
Transfer poles and wires	7	3	3	2	15
Transfer poles, wires and city lamps	1	9	8	2	20
Reset poles	17	63	27	41	118
Remove poles and wires	14	15	7	12	48
String wires	734	1,262	715	943	3,654
String wires and hang lamps	28	46	20	50	144
Subways	14	12	15	25	66
Subsidiaries	15	26	32	189	262
Conductors	17	44	43	60	164
Total	1,009	1,609	1,132	1,499	5,249

Permits, telephone and signal	3,507
Permits, electric light and power	1,742
Total	5,249

Report of Complaints Sent to Various Companies and Contractors.

Complaints Issued—	
First quarter	210
Second quarter	180
Third quarter	186
Fourth quarter	154
Total	730

Complaints Attended to—	
First quarter	183
Second quarter	164
Third quarter	188
Fourth quarter	159
Total	694
Complaints not attended to	401

Interior

Quarter.	Applications Received.	Certificates Granted.
First	526	352
Second	626	542
Third	478	431
Fourth	534	416
Total	2,164	1,741

Work.

Incandescent Lights.	Arc Lights.	Mains.	Heaters.	Motors in H. P.	Generators in K. W.
11,168	30	7	..	30 — 223.38	1 — 17
16,616	107	37	1	67 — 608.87	20 — 17,622
15,501	49	6	..	288 — 919.75	12 — 619.65
15,813	85	8	..	39 — 373.75	4 — 381
59,098	271	58	1	424 — 2,125.75	37 — 18,639.65

Total number of applications left over for work not completed..... 830
Total number of inspections, interior and exterior..... 28,517

Report of Poles and Wires Removed by the Different Companies Operating in the Borough of Queens.

	Poles.	Wires, Miles.
New York and New Jersey Telephone Company	17	157.31
New York and Queens Electric Light and Power Company	15	16.33
Queens Borough Gas and Electric Company	..	
New York and Queens County Railway Company	4	.5
Knickerbocker Telegraph and Telephone Company	..	
Western Union Telegraph Company	..	
Postal Telegraph and Cable Company	..	
Jamaica Water Supply Company	..	
Police Department	..	
Fire Department	..	
New York Telephone Company	..	
Seaside Light, Heat and Power Company	..	
North Beach Electric Light and Power Company	..	
Bowery Bay Electric Light and Power Company	..	
New York and North Shore Railway Company	..	
Brooklyn Heights Railroad Company	4	
Ocean Electric Railway Company	..	
New York and Rockaway Beach Railway Company	..	
DeKalb Avenue and North Beach Railroad Company	..	
Coney Island and Brooklyn Railroad Company	..	
Brooklyn, Queens County and Suburban Railroad Company	..	
United States Life Saving Service	..	
New York and Long Island Traction Company	..	
Long Island Electric Railway Company	8	
New York and Long Island Telegraph and Telephone Company	..	
Long Island Railroad Company	..	
Total	48	174.14

VI.

OFFICE OF THE DEPUTY COMMISSIONER.

BOROUGH OF RICHMOND.

Office of the Deputy Commissioner,
Department of Water Supply, Gas and Electricity,
St. George, January 2, 1907.

Hon. JOHN H. O'BRIEN, Commissioner Water Supply, Gas and Electricity, No. 21 Park Row, New York City:

Dear Sir—I herewith respectfully submit a yearly report of the operations of the Division of Water Supply, Gas and Electricity, located in the Borough of Richmond, for the year ending December 31, 1906.

Respectfully,

EDWARD I. MILLER,
Deputy Commissioner, Water Supply, Gas and Electricity.

Trial Balance and Statement of Appropriation of Salaries of Deputy Commissioner, Cashier, Inspectors, Etc., as Per Ledger.

Amount of appropriation for the year 1906	$6,900 00
Amount of vouchers certified to Comptroller to date	6,049 92
Balance of appropriation December 31, 1906	$850 08

Trial Balance and Statement as Per Ledger of Appropriation of Pumping Stations. Salaries and Supplies.

Amount of appropriation for the year 1906		$13,000 00
Amount of vouchers certified to Comptroller to date		11,671 92
		$1,328 08
Outstanding orders:		
Coal	$1,000 00	
One barrel cylinder oil	30 00	
Two dozen fire hydrants and drip valves	20 00	
Four thousand Bristol charts	30 00	
		1,080 00
Balance of appropriation December 31, 1906		$248 08

Trial Balance and Statement as Per Ledger of Appropriation, Rental of Fire Hydrants.

Amount of appropriation for the year 1906	$30,052 50
Amount of vouchers certified to Comptroller to date	14,597 50
Balance of appropriation December 31, 1906	$15,455 00

Trial Balance and Statement, as Per Ledger of Water Fund.

Amount of Water Fund, Borough of Richmond	$4,836 77
Additional appropriation	1,500,000 00
	$1,504,836 77
Vouchers certified to Comptroller to date	15,023 36
Total of Water Fund, December 31, 1906	$1,489,813 41

Statement of Water Rents and Charges Collected and Deposited.

Annual frontage and extra rate	$375 79
Penalties on deferred bills and annual rates	8 05
Meter rate for water supplied in buildings	3,722 25
Charges for water supplied for building purposes	104 90
Meter rates for water supplied in shipping	
Charges for water in shipping not metered	
Charges for water for street sprinkling	
Charges for water for miscellaneous purposes	
Charges for permit to tap water	
	$4,210 99
Paid to City Chamberlain	$4,165 34
Cash deposit on hand	45 65
	$4,210 99

Number of taps on service in this Borough on mains belonging to The City of New York for the year ending December 31, 1906, one hundred and one (101).

Statement of Service of Well Pumps and Force Pumps, Coal Consumption, Etc.

Amount of coal used, gross tons	646.387
Amount of machine oil used, gallons	119.625
Amount of cylinder oil used, gallons	114.355
Amount of packing used, pounds	62
Amount of waste used, pounds	235

Well Pumps.

	Hours.
6-inch well, No. 1	
8-inch well, No. 2	448
10-inch well, No. 3	691½
10-inch well, No. 4	
10-inch well, No. 5	3,807½
10-inch well, No. 6	4,198
10-inch well, No. 7	964
10-inch well, No. 8	4,483½
Total	14,592½

Worthington Force Pumps.

	Hours.
No. 1	3,037¼
No. 2	3,656½
Total	6,693¾

Number of Gallons Drawn from Wells and Pumped to Standpipe, from January 1, 1906, to December 31, 1906, Inclusive.

No. 1	34,152,793.36
No. 2	43,465,977.49
	77,618,770.85

Hours of Service.

Enginemen, pumping station	5,912
Stokers	5,576
Laborers	5,088

Expenditures.

Salaries of Enginemen	$3,171 10
Salaries of Stokers	1,770 00
Wages of Laborers	1,316 00
Coal	4,022 96
Waste	16 45
Packing	6 71
Oil	167 20
Total	$10,470 42
Cost of production, per thousand gallons	$0 1348
Average daily consumption, gallons	212,650

	Extra
Laborers employed at pumping station, hours	2,508

Statement of Lengths of Water Mains in Use December 31, 1906. Lengths Added During the Year 1906, with Number of Stopcocks and Hydrants.

Size of Mains in Use December 31, 1906.		Additions
12-inch main	17,080.00	
8-inch main	8,182.75	
6-inch main	38,049.85	
6-inch main	8,211.90	
Total	71,524.50	

Stopcocks in Use December 31, 1906.		Additions.
12-inch stopcock	16	
8-inch stopcock	18	
6-inch stopcock	99	
4-inch stopcock	15	
Total	148	

Hydrants.

Supplied by the Staten Island Water Supply Company	618
Supplied by the Crystal Water Company	450
Supplied by the South Shore Water Works	18
Supplied by the Tottenville Water Works	136
Total	1,222

Contract Statement, Including Contracts in Progress, Contracts Made, Contracts Completed.

Title of Work.	Name of Contractor.	Date of Contract.	Date of Expiration of Contract Time.	Estimated Cost.
For furnishing, delivering and storing 700 gross tons (2,240 pounds to a ton) of egg size White Ash anthracite coal at the Pumping Station, Tottenville	G. W. DuBois	Feb. 9, 1906	Feb. 4, 1907	$4,375 00

VII.

BUREAU OF LAMPS AND LIGHTING.

Department of Water Supply, Gas and Electricity,
Bureau of Lamps and Lighting, Nos. 13 to 21 Park Row,
New York, December 30, 1907.

Hon. JOHN H. O'BRIEN, Commissioner:

Dear Sir—I transmit herewith the annual report for the year 1906, drawn on somewhat different lines from the past, which were designed by this Bureau to meet the varied requests for information made on it. These tabulated reports give the detailed engineering and financial statements necessary to a complete understanding of the light and power service in kind and amount in the Boroughs of Manhattan and The Bronx, Borough of Brooklyn, Borough of Queens and the Borough of Richmond.

This report can properly be called a preliminary or interim report. The last annual report made was for the year 1904. The period covering the years 1903, 1904, 1905 and 1906, is the period during which the lighting agitation took place on the question of the rates charged to the City, the City claiming these rates were excessive, and the companies refusing to reduce same.

It is intended, as soon as the accounts can be finally checked for the year 1905, which is still outstanding, to make a complete and comprehensive report covering the whole four years and giving the history of the entire controversy, including the results of the investigations, the laws passed by the Legislature, the result of the contested cases in court, and finally a statement showing the complete effect on the cost of lighting to The City of New York, including compromise settlements, so far as it is possible to show it. Such a report will, in my opinion, be a most valuable record for this Department, and absolute proof that these lighting controversies have been carefully and conscientiously conducted by those concerned for the benefit of The City of New York only, and so far as was possible in a spirit of fairness to all parties concerned.

In order to do this, the reports of 1903 and 1904 must be revised as soon as the conflicting accounts are settled. Until settlements now in dispute are effected or final decisions in court given on contested cases, no man can state accurately, now, the result on the financial showing of these years. A report on settlements made in 1906 is appended.

The year 1905 is even further complicated than 1903 and 1904 on account of the fact that it was during this year the legislative inquiry took place and the Legislature, on the report of the investigating committee, passed what are known as the "Lighting Laws of 1905," which have held to date, with one or two amendments.

The Consolidated Gas Company objected to these laws where they affected them, on the ground that they were unconstitutional, because confiscatory. This matter is still before the courts, and the City has good ground to be hopeful of a favorable

decision before the United States Supreme Court, to which body the case will be appealed. But during 1905, the lighting for the first half of the year was charged to the City at the rates which the City states are excessive. During the last half of the year, it is charged in a number of instances at the rates set by the Legislature. A number of the companies, however, pending a decision of the suits, particularly the gas companies, have not put in any bills at all.

This Department has carefully kept, however, the consumptions for the Boroughs of Manhattan and The Bronx at any rate, and will be able to check these bills exactly when they ultimately are received. At what rate the court will finally settle on, it is now impossible to say, and it is impossible for this Department to make a report which will comply with the law which states that we should do so.

Up to February 1, 1906, the City and the companies have not been able to agree upon the prices, and no contracts for the lighting during these years were made. The only contracts governing during these periods were old, long term contracts made prior to the beginning of the controversy.

Towards the end of 1905, the writer, who was then Engineer of Surface Construction in the Boroughs of Manhattan and The Bronx, was made Chief Engineer of Light and Power of the five Boroughs.

Under the protection of the legislative rates, an attempt was made to again renew contract relations with the companies, and a very careful revision of the contract forms and specifications was made in connection with the Corporation Counsel's office, and bids were finally advertised to be opened February 1, 1906. When these bids were opened they were found to be, in some cases, considerably below the statutory price, and it will be noted in the accompanying statements that the month of January is, in a number of cases, at a higher rate than for the balance of the year.

Bids had also been called for consolidating the total number of arc lamps supplied by the various companies in the Boroughs of Manhattan and The Bronx, so that a bid could be obtained on the total number, instead of on the separate numbers of lights in each company's territory.

In considering the bids after opening them, a further careful and exhaustive investigation was made in connection with the Corporation Counsel's office, and the recommendations made by the Chief Engineer of Light and Power were carefully reviewed and confirmed by a Board of Advisory Engineers, which the Corporation Counsel had engaged to assist in trying the Consolidated Gas Company's cases. After approval by the Commissioner of this Department and the approval of the Corporation Counsel acting on the report of his Board of Engineers, the Commissioner of this Department submitted the entire matter to the Mayor of the City, the Hon. George B. McClellan. The recommendations of the Commissioner and the Corporation Counsel received the Mayor's approval, and after this the contracts were taken up for execution. In many instances, on the combined report of the Engineers, con-

cessions were received below the bid prices, and contracts were finally made on the basis as shown in the tabulated reports attached. An abstract of the bids received is also given.

On March 14, the Chief Engineer of Light and Power was formally put in charge of the lighting of the other Boroughs. Prior to this time he had been acting merely in an advisory capacity. Immediate steps were taken towards the improvement of lighting conditions in the other Boroughs, to conform to those that had been previously made in the Boroughs of Manhattan and The Bronx, and during September and October a change was made from open flame to mantle lamps in the Boroughs of Brooklyn and Queens, both as to gas and naphtha. Earlier in the year the open flame gas and naphtha lamps in the Boroughs of Manhattan and The Bronx had also been changed. So that before the end of 1906, practically all open flame lamps had ceased to be used in the lighting of The City of New York.

The marked improvement in the lighting was highly appreciated and more than justifies the comparatively slight additional expense. The old open flame lamp gave from twelve to sixteen candle power, depending on the amount of gas consumed. The new lamps give uniformly at least fifty candle power on the street. The light in candle power therefore was increased over 300 per cent. The cost of the mantle lamps over the open flame lamps was not more than 40 per cent.

Certain rearrangements in lighting were made in consequence, and the conditions generally improved. The old gas lamps in many cases were antiquated, out of repair and little care was taken as to their maintenance. The improvement in the maintenance of the mantle lamps over the open flame is most marked, and is a matter of pride both to the City and the companies.

In making the statement that the open flame lamps have disappeared from the lighting of The City of New York since the fall of 1906, an exception should be made in regard to the territory of the Kings County Lighting Company, in the Thirtieth Ward of the Borough of Brooklyn. An old contract existed with this company, which provided only for service by open flame gas lamps, prevented any change of location, and made the situation practically impossible to improve. The rate charged for these lamps, twenty-eight dollars ($28) per lamp per year, was deemed so high at this time for the service rendered, that the then Commissioner wisely decided to order no more of these lamps. This contract had been attacked once or twice by the City, but it had been unable to legally break same.

It was found in this contract that the use of mantle naphtha lamps was not excepted, and after advice of the Corporation Counsel, this Department started to order these lamps put in place, instead of ordering lamps from the Kings County Company. After this the company endeavored to negotiate with the City in order to obtain this business. These negotiations at the end of 1906, while promising, were going along slowly. It was the definite idea on the City's part that some improvement

must be made, if there was any possible way of obtaining it. The company appeared at this time to begin to think that possibly it would be much better to consider a policy of improvement, than to assume the attitude it had previously, of refusing to make any change in the provisions of the contract, no matter how unreasonable and galling these conditions might be.

In describing the improvements in the Boroughs of Manhattan and The Bronx, Brooklyn and Queens, we regret that it is impossible to report similar improvement in the Borough of Richmond. During the months of June and July, the electric lighting plant furnishing the lighting on Staten Island broke down, apparently from long neglect. Both the lighting and the transportation service greatly suffered, the repairs necessary to the plant were so large that there was no chance of their being finished during the year 1906, and it was not until late in the fall that the service began to get back to anything near normal.

The Chief Engineer of Light and Power made a number of visits to the island and endeavored, so far as possible, to lend the aid of his experience to the company, in order to obtain what lighting he could. It was impossible for them at the time, for a considerable period, to carry all the lighting they had contracted for, and it was necessary for the Chief Engineer to choose and direct which lighting should be maintained and which left unlighted. A complete report of this matter was made to the Commissioner, and also to the Comptroller of The City of New York. Little improvement, however, can be hoped for until the succeeding year.

LIGHTING AND POWER IN PUBLIC BUILDINGS.

During the year also a strong effort was made to properly control and improve the lighting in public buildings throughout the City, and the new methods of checking, tabulating and supervising this lighting were put in force in all Boroughs and have so far produced good results.

In lighting the public buildings we always find a mass of detail work necessary to do, which makes progress slow. Such detail in each of the buildings is comparatively small and of apparently little effect, but when the total result is multiplied by the number of buildings, something over fifteen hundred (1,500) at this date, with a total of hundreds of thousands of gas and electric lamps, the result becomes of great importance.

Furnishing as we do the lighting and power by electricity and gas in all other departments except one or two, this Department becomes a part of the domestic economy of every other department. To handle the mass of detail referred to properly and effectively, we will require a number more Inspectors than the Department can at present afford, and in my opinion will require a set of rules to be put in the hands of the different department employees who are responsible for lighting and power. These rules should be approved by the Commissioner and ordered, in my opinion, by the Mayor, and it

is the intention of the Department to submit such rules and regulations to you at a later date,,when it has determined fully what is absolutely necessary.

In closing I would draw your attention to the extremely gratifying work of a large number of the Inspectors in this Department, as is shown by the considerable saving effected to the City in the rebates for outages which it has received, and in the increased efficiency of the lighting.

During this year the inspection system which had been in force for some time in the Boroughs of Manhattan and The Bronx, was put in force by the Chief Engineer in the Boroughs of Brooklyn, Queens and Richmond. Additional Inspectors were added to the force and all the Street Inspectors were put under a Chief Inspector in each Borough. Counts were made in whole or in part of the lamps in the different Boroughs, and the results are being mapped and made a final record.

The methods of ordering new lamps, ordering repairs and checking same, and keeping the accounts of these items were all made uniform with Manhattan and The Bronx. The theory of lighting avenues with arc lamps, and side streets with gas lamps, has also been adopted so far as was possible, and in consequence the detailed routine of the various offices is now following the same system. Considerable improvement has resulted from so systematizing these matters.

A report is attached from Mr. G. F. Sever on the testing of electric meters by Columbia University for the year 1906. This is the beginning of meter testing for outside consumers under the Charter and the Public Service Commissions Law. Few meters were tested during 1906, but since that time the testing has become much greater, on account of the increased popularity of the method adopted.

A report is attached from Mr. G. F. Sever on the testing of electric meters by giving the results of his tests of gas under the Laws of 1905, by quarters throughout the year. Under the new requirements of the law, six (6) additional testing stations have been equipped and put in operation during the year in the Boroughs of Brooklyn, Queens and Richmond. It is hoped that the remaining stations required will be put into operation in 1907.

The usual statistics of new lamps, changes in mains, repairs, outages and public buildings, are submitted by the Chief Inspectors of the street lighting and of public buildings in the Boroughs of Manhattan and The Bronx. Attention is called to these reports to show the improvement effected in lighting in detail. This system could not be put in force in the other boroughs so that reports could be made for 1906, as the Chief Engineer did not assume control of these boroughs until the month of March, and the Chief Inspectors and Inspectors did not take charge and begin the new system until late in that year. In 1907 similar statistics will be put in by all boroughs.

All of which is respectfully submitted.

C. F. LACOMBE,
Chief Engineer of Light and Power.

February 8, 1908.

Mr. J. H. O'BRIEN, Commissioner, Department of Water Supply, Gas and Electricity, No. 13 Park row, New York, N. Y.:

Dear Sir—I submit herewith a digest of the establishment and conduct of the electrical meter testing work up to December 31, 1906.

On June 15, 1905, I submitted to the Hon. John T. Oakley, then Commissioner of the Department of Water Supply, Gas and Electricity, a report containing the provisions of section 519, chapter 466, Laws of 1901, of the amended Greater New York Charter, which provides for the testing of electric meters; an abstract from Assesmbly Bill No. 2355, of May 1, 1905, covering the power delegated by the Legislature to the Commission of Gas and Electricity, and pertaining to the inspection of gas and electric meters; also a statement showing the operation of the Meter Testing Bureau of the Board of Gas and Electric Lighting Commissioners of the Commonwealth of Massachusetts.

I offered as means whereby the City could secure the authoritative testing of electric meters a contract to be entered into by the City and Columbia University, the City to appropriate $1,500 for this purpose and to have the use of the equipment of our electrical engineering laboratories.

Columbia University was to utilize the services of a competent man connected with the electrical engineering department to conduct this work, and also test all electrical devices which enter into the installation of electrical apparatus in New York City which might be referred to the University by the Department of Water Supply, Gas and Electricity.

In November, 1905, an appropriation of $1,500 was made by the Board of Estimate and Apportionment for the testing of electric meters, and after quite some negotiation and by the authorization of the Board of Aldermen, an agreement was entered into between the Department of Water Supply, Gas and Electricity and Columbia University on April 2, 1906, to the end that the services of the electrical engineering laboratories of Columbia University should be made available for the testing of electrical meters and such other devices as may be presented to it by the Department of Water Supply, Gas and Electricity.

Under this agreement Columbia University prepared suitable blank forms and made arrangements with the electric light and power companies to conduct joint tests on such electric meters as the consumer desired to have tested or about whose accuracy complaint might have been made.

The method of procedure is as follows: The consumer requests the Department of Water Supply, Gas and Electricity to test his meter, forwarding a fee of $2 for the test of each meter, and a notification is sent to the electrical engineering department of Columbia University that the test be made. An official representative of the University visits the premises and attaches to the meter a large tag and seal in-

dicating that this meter is under test and is not to be distrubed by any one. As soon after as possible and after due notification has been given to the electric light or power company owing this meter, a joint test is made by Columbia University and the lighting company.

The standards of Columbia University are carefully checked both before and after a test, and a report on a form similar to the inclosed is presented to the Department of Water Supply, Gas and Electricity. The substance of this report is then sent to the consumer.

During the year of 1906 it was agreed that a limit of 5 per cent. fast should be the standard of accuracy; that is, if a consumer's meter was over 5 per cent. fast, the $2 fee which he had paid was to be returned to him and the electric light company and the consumer were called upon to make some adjustment based on the percentage fast of the meter. If, however, the meter was 5 per cent. or less fast, the $2 fee was to remain with the City, and there was to be no adjustment of bills as between the consumer and the lighting company.

During the year ending December 31, 1906, requests for the testing of twenty-two meters were made, and the tabulated results of these tests are attached hereto.

The work has been conducted on a very high plane, the most accurate fundamental standards being employed. Meters have been tested in almost all cases at 10 per cent. of full load and full load.

In all this work the electric light and power companies have cordially co-operated and the City Department has greatly benefited through this contract relationship with Columbia University.

Columbia University is very glad to do this work, as it enables it to benefit the community and to utilize its excellent equipment for this purpose.

I trust that this arrangement may continue, as the work is increasing and may develop into a subject of considerably larger magnitude.

The saving to the City through this arrangement is very considerable and the work has been developed along lines which, from the highest technical standpoint, are considered correct.

It is not desirable to test all of the electric meters in the City either in place or before installation, for it is well known that the characteristic of all electric meters is to run slow, unless something extraordinary has happened to the meter.

I also inclose herewith one of the meter sealing tags that are used by Columbia University in carrying out the terms of the contract.

Yours very truly,

GEORGE F. SEVER.

Note—The description of the meter sealing tag is as follows:
Color—Bright yellow; printing, black.

On one side is printed the following:

Do Not Open or Remove this Meter.

At the request of the consumer,

.....

this meter has been inspected and sealed and is being held for test for the
Department of Water Supply, Gas and Electricity
of
The City of New York
by
Columbia University, New York City.

Date.....
No..... Test Officer.

On the reverse side is printed in very large letters the words:
Columbia University.

Monthly Applications from Department of Water Supply, Gas and Electricity for Electric Meter Tests.

December 31, 1906.

The following is a list of applications for meter tests received each month:

The number of meters given is that number of which applications for tests from the Department of Water Supply, Gas and Electricity were received.

August	5
September	4
October	3
November	4
December	6
Total	22

REPORT OF TEST OF ELECTRIC METER

FOR

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY,
City of New York.

Name of Consumer.....
Address
Consumer's load..... current
Make and Type of meter.....amp.....volt.....wire
Owner's number.....Disk constant.....Testing constant.....=C'
Maker's Number.....Disk constant.....Testing constant.....=C'

Rated full load watts on meter during tests.....=L

Creeping.....due to.....

Rate of Creeping.....rev.....min.....sec.

Revolutions: True Ratio of A/Standard	Revolutions: True Ratio of B/Meter	Revolutions: Observed Ratio of R/Standard	Revolutions: Observed Ratio of B/Meter	Standard: S Seconds	Standard: $W = K\frac{R}{S}$ = Watts	% Rated Load $= 100\frac{W}{L}$	% Registered $= P\frac{A}{R}$
.....							
.....							
.....							
.....							
.....							
.....							
.....							
.....							
.....							

Data on the Standard Test Meter used. A : B=C' : C

Scales: Volt	Scales: Ampere	Constants: C	Constants: K=3600xC	% Registration P
.....				

Standard Meter No.....

Watch No.....

Time of Test.....to.....

Signed.....

Test Officer.

Columbia University, New York City.

Date of Test..... Test No.....

Tabulation of Results of Electric Meter Testing for Department of Water Supply,

Operating Company.
New York Edison Company
New York Edison Company
New York Edison Company
New York Edison Company
New York Edison Company
New York Edison Company
New York Edison Company
New York Edison Company
New York Edison Company
New York Edison Company
United Electric Light and Power Company
United Electric Light and Power Company
Brooklyn Edison Company
Brooklyn Edison Company
Brooklyn Edison Company
United Electric Light and Power Company
New York Edison Company
New York Edison Company
New York Edison Company
New York Edison Company
Brooklyn Edison Company
Brooklyn Edison Company

Gas and Electricity by Columbia University, New York, to December 31, 1906.

Test No.	Capacity of Meter.		Wire.	Light Load.			Full Load.		
	Amperes.	Volts.		Per Cent. Load.	Per Cent. Fast.	Per Cent. Slow.	Per Cent. Load.	Per Cent. Fast.	Per Cent. Slow.
1	10	240	2				66		9.3
2	50	240	2	11	0.3		86		1.5
3	50	240	2	11		7.3	80	0.1	
4	25	240	2	15		12.0	79		5.8
5	5	240	3	7	0.8		97	0.4	
6	3.5	240	3	10		25.5	96		1.8
7	10	240	3	12	10.2		92	7.8	
8	50	240	2	11	2.5		80	7.0	
9	7.5	240	3	11		23.2	77	4.0	
10	15	240	3	10		0.3	75	1.1	
11	10	200	3	12		3.2	100		0.7
12	40–2	200	..	21		1.2	115	0.5	
13	25	220	2	13	0.3		114	4.5	
14	25	220	3	7		2.6	57	1.2	
15	10–2	230	..				76		0.1
16	40–2	200	..	10	2.1		83	1.3	
17	25	240	3	11		6.2	70	0.1	
18	15	240	3	9	3.8		54	0.6	
19	25	240	3	10	3.0		72		2.0
20	75	240	3	10		1.3	53		2.9
21	5	115	2				86		3.3
22	10	230	3	11		10.3	90	1.2	

Tabulation of Electric Meter Tests for Department of Water Supply, Gas and Electricity of New York City to December 31, 1906.

Light Load.

Per Cent. Variation.	Number Fast.	Per Cent. of Total.	Number Slow.	Per Cent. of Total.	Number Correct.	Per Cent. of Total.	Total.
0–1	3	15.75	1	5.27			4
1–2	..		2	10.51			2
2–3	2	10.51	1	5.27			3
3–4	1		1	5.27			2
5–6	..		..				..
6–7	..		1	5.27			1
7–8	1	5.27	1	5.27			2
10–11	1	5.27	1	5.27			2
11–12	..		1	5.27			1
23–24	..		1	5.27			1
25–26	..		1	5.27			1
	8		11				19
Not tested at light load							3
							22

Two, or 10.5 per cent., over 5 per cent. fast.

Eleven, or 57.9 per cent., between 5 per cent. fast and 5 per cent. slow.

Six, or 31.5 per cent., over 5 per cent. slow.

Nineteen, or 100 per cent., tested at light load.

Tabulation of Electric Meter Tests for Department of Water Supply, Gas and Electricity of New York City to December 31, 1906.

Full Load.

Per Cent. Variation.	Number Fast.	Per Cent. of Total.	Number Slow.	Per Cent. of Total.	Number Correct.	Per Cent. of Total.	Total.
0–1	5	22.75	2	9.1			7
1–2	4	18.2	3	13.62			7
2–3	..		1	4.54			1
3–4	1	4.54	1	4.54			2
4–5	1	4.54	..				1
5–6	..		1	4.54			1
6–7	1	4.54	..				1

Per Cent. Variation.	Number Fast.	Per Cent. of Total.	Number Slow.	Per Cent. of Total.	Number Correct.	Per Cent. of Total.	Total.
7–8	1	4.54	..				1
9–10	..		1	4.54			1
	13		9				22

Two, or 9.08 per cent., over 5 per cent. fast.
Eighteen, or 81.84 per cent., between 5 per cent. fast and 5 per cent. slow.
Two, or 9.08 per cent., over 5 per cent. slow.
Twenty-two, or 100 per cent., tested.

Department of Water Supply, Gas and Electricity,
Bureau of Lamps and Gas,
Office of Chief Gas Examiner, No. 122 Bowery,
New York, January 15, 1907.

Mr. C. F. LACOMBE, Chief Engineer of Light and Power:

Dear Sir—I submit herewith a report on the work at the photometric stations of the Department for the year 1906.

At present there are eight stations in operation, the location of which together with the date of opening and the gas supplies tested in each are as follows:

Station.	Location.	Opened.	Cases Tested.
Grand Street.....	Corner Grand street and the Bowery...	1877.	Consolidated, Branches 1 and 2, New York Mutual.
Seventy-ninth Street..	Seventy-ninth street, between Second and Third avenues.....	1877.	Consolidated, Branches 3, 4 and 6, New Amsterdam, Standard.
Lee Avenue.....	Lee avenue and Rodney street, Brooklyn	Feb. 19, 1906	Brooklyn Union, Nassau and Williamsburg branches.
Court Street.....	Court street and Atlantic avenue, Brooklyn	Mar. 27, 1906	Brooklyn Union, Fulton and Citizens' branches.
Sixth Avenue.....	Sixth avenue, near Union street, Brooklyn	April 9, 1906	Brooklyn Union, Metropolitan branch.
New Utrecht.....	New Utrecht avenue, near Sixtieth street, Brooklyn	Aug. 6, 1906	Kings County Lighting.
Richmond.....	No. 407 Richmond terrace, New Brighton	April 20, 1906	New York and Richmond.
Rockaway.....	No. 6 North Fairview avenue, Rockaway Beach	Oct. 22, 1906	Queens Borough Gas and Electric.

At the eight stations already in operation there are sixteen separate gas supplies being tested daily. In 1907 it is proposed to establish four more stations for testing the remaining four gases supplied in Greater New York.

As required by the Charter the results of the daily tests made at the several stations have been transmitted to the Department.

The following tables contain a summary of these results, giving the averages for each quarter, together with the yearly average.

Very truly yours,
E. G. LOVE, Chief Gas Examiner.

Gas Company.	Station.
Consolidated, Branch No. 1	Bowery and Grand street
Consolidated, Branch No. 2	Bowery and Grand street
Consolidated, Branch No. 3	Nineteenth street, between Second and Third avenues
Consolidated, Branch No. 4	Nineteenth street, between Second and Third avenues
Consolidated, Branch No. 6	Nineteenth street, between Second and Third avenues
New York Mutual	Bowery and Grand street
New Amsterdam	Seventy-ninth street, between Second and Third avenues
Standard	Seventy-ninth street, between Second and Third avenues
Brooklyn Union—	
Nassau	Lee avenue and Rodney street, Brooklyn
Williamsburg	Lee avenue and Rodney street, Brooklyn
Fulton	Atlantic avenue and Court street, Brooklyn
Citizens'	Atlantic avenue and Court street, Brooklyn
Metropolitan	Sixth avenue, near Union street, Brooklyn
New York and Richmond	No. 407 Richmond terrace, New Brighton, S. I.
Kings County Lighting	No. 5912 New Utrecht avenue, Brooklyn
Queens Borough Gas and Electric	North Fairview avenue, Hammel's
New York and Queens	Flushing
Central Union	One Hundred and Forty-eighth street
Bronx Gas and Electric	Morris Park

Average Candle Power for Quarter Ending				Average Candle Power for Year.	Number of Violations When Candle Power was Below 22.
March 31, 1906.	June 30, 1906.	Sept. 30, 1906.	Dec. 31, 1906		
23.52	22.76	23.29	23.50	23.27	1
22.57	22.49	22.87	22.85	22.69	6
24.48	23.76	23.39	23.63	23.81	2
23.89	23.36	23.06	23.74	23.51	3
24.75	23.81	23.67	23.97	24.05	1
23.30	23.38	23.35	23.19	23.30	5
24.45	23.52	23.73	23.94	23.91	2
24.15	23.43	23.59	23.76	23.73	3
23.21	23.01	23.40	23.25	23.22	10
23.38	23.33	24.40	22.93	23.51	15
.....	25.63	24.63	24.77	25.01	..
....	25.32	24.18	23.81	24.44	2
.....	25.42	23.89	23.99	24.43	..
.....	23.27	23.60	23.22	23.36	17
.....		22.29	21.96	22.12	41
.....			24.08	24.08	..
.....					..
.....					..
.....					..

Average Maximum and Minimum Pressures

Gas Company.	Location of Stations Where Pressures are Recorded.
Consolidated, Branch No. 1.....	Bowery and Grand street.....
Consolidated, Branch No. 2.....	Bowery and Grand street.....
Consolidated, Branch No. 3.....	Bowery and Grand street.....
Consolidated, Branch No. 4.....	Nineteenth street, between Second and Third avenues.....
Consolidated, Branch No. 6.....	Nineteenth street, between Second and Third avenues.....
New York Mutual.....	Bowery and Grand street.....
New Amsterdam.....	Bowery and Grand street.....
New Amsterdam.....	Seventy-ninth street, between Second and Third avenues....
Standard.....	Seventy-ninth street, between Second and Third avenues....
Brooklyn Union—	
Nassau	Lee avenue and Rodney street, Brooklyn.....
Williamsburg	Lee avenue and Rodney street, Brooklyn.....
Fulton	Atlantic avenue and Court street, Brooklyn.....
Citizens	Atlantic avenue and Court street, Brooklyn.....
Metropolitan	Sixth avenue, near Union street, Brooklyn.....
New York and Richmond.....	No. 407 Richmond terrace, New Brighton, S. I.....
Kings County Lighting.....	No. 5912 New Utrecht avenue, Brooklyn.....
Queens Borough Gas and Electric...	North Fairview avenue, Hammel's.....

for the Year Ending December 31, 1906.

March 30.		June 30.		September 30.		December 31.		Average for Year.		Number of Violations, Pressure in Excess of 2½ Inches.
Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	
2.25	1.78	2.05	1.43	1.96	1.82	1.99	1.62	2.06	1.66	1
2.00	1.69	1.92	1.66	1.96	1.76	1.87	1.40	1.94	1.63	..
2.03	1.78	1.97	1.83	1.99	1.84	1.95	1.65	1.98	1.77	..
1.92	1.81	1.94	1.81	2.04	1.86	2.15	1.86	2.01	1.83	..
2.35	1.98	2.37	1.99	2.44	2.04	2.37	1.93	2.38	1.98	14
2.33	2.01	2.23	1.98	2.40	2.16	2.28	1.96	2.31	2.03	5
1.94	1.42	1.77	1.40	1.75	1.39	1.88	1.36	1.83	1.39	..
3.31	1.99	2.46	1.85	2.10	1.78	2.78	1.78	2.66	1.85	154
2.46	1.98	2.43	2.02	2.38	1.99	2.46	1.85	2.43	1.96	44
3.45	1.60	2.95	1.65	2.75	1.60	3.50	1.65	3.16	1.62	257
3.10	1.85	2.90	1.65	3.10	1.70	3.55	1.65	3.16	1.71	258
....		2.30	1.64	2.33	1.68	2.53	2.11	2.39	1.81	53
....		2.38	1.74	2.36	1.70	2.47	1.80	2.40	1.75	65
....		2.57	1.70	2.83	1.86	2.65	1.62	2.68	1.73	138
....		3.55	1.97	3.66	1.99	3.46	1.52	3.56	1.83	213
....				3.14	1.24	4.18	1.26	3.66	1.25	125
....						3.69	2.30	3.69	2.30	55

Sulphur, Ammonia and Sulphuretted

Gas Company	March 31.			June 30.		
	Sulphur.	Ammonia.	Sulphuretted Hydrogen.	Sulphur.	Ammonia.	Sulphuretted Hydrogen.
Consolidated Branch No 1	7.89			6.82	.13	s. t. o.
Consolidated Branch No. 2	12.13	.199	tr.	12.33		tr.
Consolidated Branch No. 3	8.24	.278		7.97	.13	
Consolidated Branch No. 4	7.36	.08				
Consolidated Branch No 6	6.77	.25	s. t.			t.
New York Mutual	9.56	.28		8.77	.24	s. t. o.
New Amsterdam	8.50	.90		8.13	.32	
Standard				7.63		s. t. o.
Brooklyn Union Nassau			b. t.	3 56		t.
Brooklyn Williamsburg	..	. .	b. t.	4.05		b. t.
Brooklyn Fulton				. .		
Brooklyn Citizens						
Brooklyn Metropolitan		. .		...		
New York & Richmond						
Kings County Lighting		. .		...		
Queens Borough Gas & Electric						

Hydrogen for Quarters Ending 1906.

September 30.			December 31.			Averages.	
Sulphur.	Ammonia.	Sulphuretted Hydrogen.	Sulphur.	Ammonia.	Sulphuretted Hydrogen.	Sulphur.	Ammonia.
6.75		s. t. o.	7.15	.04	s. t.	7.15	.04
14.47	.75	s. t. o.	12.98	.32	s. t. o.	12.98	.32
7.52	.29		7.91	.23		7.91	.23
....			8.78	.23		8.07	.15
....		s. t. o.	7.90		s. t.	7.33	.12
8.55		s. t.	8.96	.17	s. t. o.	8.96	.17
8.77	.21		8.50	.48		8.50	.48
....			8.02			7.82	
3.81		s. t.	3.25		t.	3.54	
5.34		t.	2.33			3.91	
....			5.37	.76	s. t. o.	5.37	.76
....			6.36	.51	s. t.	6.36	.51
....			5.44	.62	s. t. o.	5.44	.62
....					t. o.		
....		t. o.			s. t. o.		
....					s. t. o.		

Specific Gravity for Quarters Ending 1906.

Gas Company.	March 31.	June 30.	Sept. 30.	Dec. 31.	Averages.
Consolidated Branch No. 1	.647	.642	.662	.649	.650
Consolidated Branch No. 2	.560	.552	.573	.584	.567
Consolidated Branch No. 3	.645	.636	.636	.650	.642
Consolidated Branch No. 4	.626	.622	.634	.653	.634
Consolidated Branch No. 6	.629	.629	.642	.649	.637
New York Mutual	.646	.651	.659	.652	.652
New Amsterdam, Seventy-ninth street	.631	.626	.644	.646	.637
Standard	.637	.629	.645	.652	.641
Brooklyn Union—Nassau	.632	.608	.623	.665	.632
Brooklyn Union—Williamsburg	.625	.599	.641	.654	.630
Brooklyn Union—Fulton		.660	.662	.657	.660
Brooklyn Union—Citizens		.663	.670	.653	.662
Brooklyn Union—Metropolitan		.642	.647	.652	.647
New York & Richmond		.651	.635	.645	.644
Kings County Lighting			.660	.650	.655
Queens Borough Gas & Electric				.657	.657

SETTLEMENTS MADE DURING 1906.

Report Showing Results for Gain in Settlements Made by the City With Various Lighting Companies, Based Upon Adjustments Approved by the Comptroller and the Commissioner of Water Supply, Gas and Electricity, Acting Under the Approval of the Corporation Counsel of the Law Department.

Settlements of Accounts from January 1, 1903, to January 31, 1906.

New York and New Jersey Globe Gas Light Company (Naphtha Lamps)—The basis of settlement with the New York and New Jersey Globe Gas Light Company for lighting public streets throughout the City, consists of an agreement by which the company is to receive $1.74 per lamp per month, or $20.88 per year throughout all Boroughs, with no charge for interest. The bid price billed for the corresponding periods and Boroughs was $22 per lamp per year. The saving to the City on the basis of this adjustment is summarized as follows:

Original bills on bid prices	$118,515 62
Bills rendered as per adjustment	110,978 80
Net gain to the City	$7,536 82

Welsbach Street Lighting Company of America (Naphtha Mantle Lamps)—The basis of adjustment with this company was $2.27 per lamp per month, or $27.24 per year, without interest, against $30 per lamp per year on the basis of the bid prices. The saving to the City on the basis of this adjustment is summarized as follows:

Original bills on bid prices	$146,969 70
Bills rendered as per adjustment	135,399 27
Net gain to the City	$11,570 43

New York and Queens Electric Light and Power Company—The basis of adjustment with this company consists, for the most part, in a reduction of the prices for street arc lighting, and is as follows:

For the years 1903, 1904, and from January 1, 1905, to June 30, 1905, the price agreed upon for arc lighting was $107.50 per lamp per year. For the period from July 1, 1905, to January 31, 1906, the price agreed upon for arc lighting was $96.00 per lamp per year.

It was also agreed upon that the City pay to the said company interest on all balances due the company on all lighting bills from January 1, 1903, to the date of settlement by the Department of Finance. This carried with it interest charges on balance of bills for all street lighting, including the "Woodhaven District" contract (the terms of which were $97.50 per lamp per year for arc lighting), which expired on January 31, 1906, Public Buildings and Power.

The following will show the gain to the City from two points of view. Interest charges are calculated on the adjusted bills and also on the original bills rendered, and are as follows:

First, on Basis of Actual Settlement—

Total original bills, including Woodhaven	$769,260 81
Payment made in full adjustment, not including interest	692,116 04

First, on Basis of Actual Settlement—

Gain to the City on basis of adjustment of prices, not including interest	$77,144 77
Interest charges on adjusted and contract bills	44,904 60
Total net gain to City on above basis	$32,240 17

Second, on Basis of Payment of Interest on Original Bills Rendered—		
Gain to the City on the basis of adjustment without interest		$77,144 77
Interest charges on original bills	$56,865 31	
Interest on adjusted bills	44,904 60	
Net gain on interest charges		11,960 71
Total net gain on above basis		$89,105 48

Resume, Showing Gains to the City on the Basis of Above Settlements.

New York and New Jersey Globe Gas Light Company, gain	$7,536 82	$7,536 82
Welsbach Street Lighting Company of America, gain	11,570 43	11,570 43
New York and Queens Electric Lighting and Power Company, first basis	32,240 17	
New York and Queens Electric Lighting and Power Company, second basis		89,105 48
	$51,347 42	$108,212 73

Respectfully submitted,

H. R EMERSON,

Auditor, Bureau of Lamps and Lighting.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.
BUREAU OF LAMPS AND LIGHTING.

Recapitulation.

	Manhattan and The Bronx.	Brooklyn.	Queens.	Richmond.	Total.
Street Lighting	$1,169,673 71	$860,194 28	$313,303 49	$131,648 07	$2,474,819 55
Public Buildings	369,911 12	150,227 64	25,037 71	11,167 57	556,344 04
Heat and Power	30,018 08	13,428 69	728 00	201 71	44,376 48
Bureau Expenses	20,131 50	6,831 66	2,041 24	1,558 11	30,562 51
Salaries	65,465 08	22,538 24	3,652 08	3,699 96	95,355 36
Testing Electric Meters	500 00				500 00
Grand totals for Boroughs	$1,655,699 49	$1,053,220 51	$344,762 52	$148,095 42	$3,201,957 94

Statement Showing Classification of All

Appropriation.	
Street Lighting—	
Manhattan and The Bronx	
Brooklyn	
Queens	
Richmond	
Public Buildings—	
Manhattan and The Bronx	
Brooklyn	
Queens	
Richmond	
Total lighting	
Heat and Power—	
Manhattan and The Bronx	
Brooklyn	
Queens	
Richmond	
Bureau Expenses—	
Manhattan and The Bronx	
Brooklyn	
Queens	
Richmond	
Salaries, Streets and Public Buildings, Inspectors, Except Chief Engineer—	
Manhattan and The Bronx	
Brooklyn	
Queens	
Richmond	
Testing Electric Meters—	
Manhattan and The Bronx	
Grand total	

Expenditures of Bureau of Lamps and Lighting.

Electricity.	Gas.	Naphtha.	Repairs.	Gas Examiners.	Total.
$569,658 25	$510,266 62	$69,928 19	$19,820 65		$1,169,673 71
455,862 99	376,587 74	13,344 65	14,398 90		860,194 28
220,447 88	72,939 35	19,014 41	901 85		313,303 49
130,448 07		(Oil.) 1,200 00			131,648 07
190,691 78	179,219 34				369,911 12
84,643 53	65,584 11				150,227 64
15,237 00	9,800 71				25,037 71
9,245 17	1,922 40				11,167 57
$1,676,234 67	$1,216,320 27	$103,487 25	$35,121 40		$3,031,163 59
		(Steam.)			
$14,985 61		$15,032 47			$30,018 08
13,428 69					13,428 69
728 00					728 00
201 71					201 71
20,131 50					20,131 50
6,831 66					6,831 66
2,041 24					2,041 24
1,558 11					1,558 11
(Lighters in Markets.)	(Clerks and Inspectors.)	(Chief Inspector, The Bronx.)	(Revenue Bond Fund.)	Gas Examiner.	Total.
1,260 00	$43,318 14	1,500 00	$5,873 81	$13,513 13	65,465 08
.....	22,538 24				22,538 24
.....	3,652 08				3,652 08
.....	3,699 96				3,699 96
500 00					500 00
$1,737,901 19	$1,289,528 69	$120,019 72	$40,995 21	$13,513 13	$3,201,957 94

SUM

Total Number of Lamps

	Electric.				
	Arc.			Incandescent.	
	450 W.	400 W.	325 W.	25 C. P.	20 C. P.
Manhattan—					
January 1, 1907	3,630		24	92	
January 1, 1906	3,284		24	84	
The Bronx—					
January 1, 1907	1,505	681		388	
January 1, 1906	1,371	671		386	
Brooklyn—					
January 1, 1907	1,116		4,073		
January 1, 1906			4,850		
			(250 W. 210)		
Queens—					
January 1, 1907			2,525	160	15
January 1, 1906			2,357	160	15
Richmond—					
January 1, 1907	632			3,933	
January 1, 1906			*592	3,603	
Total Number Each Kind of Lamp—					
January 1, 1907	6,883	681	6,620	4,573	15
January 1, 1906	4,655	671	8,033	4,233	15
		(Arc) 14,184		(Incan.) 4,588	
Grand total, January 1, 1907 (Electric)					18,772

* Changed to 450 Watt in 1907.

MARY.

in Greater New York.

Gas.		Naphtha.		Oil.	Total Number of Lamps in Borough.	Acreage of Borough.
Mantle. 60 C. P.	O. F. 12 C. P.	Mantle. 60 C. P.	O. F. 12 C. P.	12 C. P.		
16,052	138	1,116			21.052	14 038
16,751	256	968	107		21.474	
5,921	94	1,826			10,415	26,017
6,013	95	474	1,238		10.248	
12,288	4,552	481	12		22,522	49,680
6,025	10,308	481	12		21,886	
3,409		721	17		6.845	82,883
891	2,732	116	767		7,038	
.....				100	4,665	36,600
.....				100	4,293	
37,679	4,784	4.144	29	100	65,499	
29,680	13,391	2,039	2.124	100	64.941	
(Gas) 42,454		(Naphtha) 4,173				
				100	65,499	209,218

SCHEDULE I.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Cost of Lighting Public Street Lamps, by Companies.

Appropriation, Lamps and Lighting, 1906.

New York Edison Company—Electric Arc Lighting, Borough of Manhattan.

1906.	Number of Lamps and Price Per Lamp Per Annum.						Outages.	Cost of Lighting.
	450 Watt.		250 Watt Twin.		325 Watt.			
	No.	Price.	No.	Price.	No.	Price.		
January	2,967	$100 00	*206	$130 00	24	†$84 00	$28 52	$27,116 36
February	3,084	100 00	206	130 00	24	90 00	39 34	25,832 65
March	3,096	100 00	206	130 00	24	90 00	55 46	28,611 05
April	3,107	100 00	206	130 00	24	90 00	61 11	27,817 90
May	3,150	100 00	206	130 00	24	90 00	44 49	28,973 52
June	3,175	100 00	206	130 00	24	90 00	40 01	28,310 23
July	3,180	100 00	206	130 00	24	90 00	60 84	29,388 67
August	3,194	100 00	205	130 00	24	90 00	55 45	29,470 66
September	3,239	100 00	205	130 00	24	90 00	41 11	28,768 95
October	3,259	100 00	205	130 00	24	90 00	48 57	30,024 31
November	3,308	100 00	205	130 00	24	90 00	74 93	29,332 61
December	3,425	100 00	205	130 00	24	90 00	86 29	31,038 43
							$636 12	$344,685 34

*412 actual lamps, two per post.

†Watt while at this rate.

SCHEDULE I.-A.

New York Edison Company—Edison Incandescent Lighting, Borough of Manhattan.

Month	Number of Lamps.*	Price Per Lamp. Per Annum.	Outage Deductions.	Cost of Lighting.
January	80	$22 50		$150 00
February	80	22 50		137 98
March	80	22 50		152 77
April	80	22 50		147 84
May	80	22 50		152 77
June	88	22 50		162 77
July	88	22 50		168 04
August	88	22 50		168 04
September	88	22 50		162 62
October	88	22 50		168 04
November	88	†0 0616		162 62
December	88	†0 0616		168 04
Total				$1,801 53

*90 to 100 watt series, 25 candle-power.
†Per night.

SCHEDULE I.-B.

United Electric Light and Power Company—Electric Arc and Incandescent Lighting, Borough of Manhattan.

Month.	Number of Lamps.	Price Per Lamp. Per Annum.	Outage Deductions.	Cost of Lighting.
	Arc.			
January	116	$100 00	$5 76	$943 86
	Incandescent.			
*January	†4	22 50		7 50
February	4	22 50		7 50
March	4	22 50		7 50
April	4	22 50		7 50
May	4	22 50		7 50
June	4	22 50		7 50
July	4	22 50		7 50

Month.	Number of Lamps.	Price Per Lamp Per Annum.	Outage Deductions.	Cost of Lighting
August	4	22 50		7 50
September	4	22 50		7 50
October	4	22 50		7 50
November	4	22 50		7 50
December	4	22 50		7 50
Total			$5 76	$1,033 86

*Arc lighting carried by New York Edison Company, February 1, 1906.
†Incandescent lamps, 90 to 100 watt, 25 candle-power.

SCHEDULE 1.-C.

New York Edison Company—Electric Arc Lighting, Borough of The Bronx

Month.	Number of Lamps.*	Price Per Lamp Per Annum.	Outage Deductions.	Cost of Lighting.
January	1,134	$100 00	$12 19	$9,450 00
February	1,384	100 00	76 25	10,505 85
March	1,371	100 00	42 01	11,674 31
April	1,374	100 00	144 88	11,127 89
May	1,375	100 00	85 46	11,590 32
June	1,417	100 00	28 49	11,341 01
July	1,436	100 00	40 67	12,075 37
August	1,436	100 00	54 78	12,141 27
September	1,438	100 00	43 93	11,768 27
October	1,438	100 00	75 49	12,137 55
November	1,460	100 00	35 33	11 918 99
December	1,505	100 00	147 07	12,318 56
Total			$786 55	$138,049 38

* 450 watt.

SCHEDULE I.-D.

New York Edison Company—Electric Incandescent Lighting, Borough of The Bronx.

Month.	Number of Lamps.*	Price Per Lamp Per Annum.	Outage Deductions.	Cost of Lighting.
January	370	$25 00	$0 58	$770 83
February	370	25 00	1 09	708 57
March	370	25 00	24	785 46
April	370	25 00	65	759 70
May	370	25 00		785 70
June	370	25 00	14	760 21
July	370	25 00		785 70
August	370	25 00	72	784 98
September	370	25 00	1 40	760 08
October	370	25 00	1 99	783 70
November	370	25 00	89	759 53
December	372	25 00	3 01	784 05
Total			$10 71	$9,228 51

* 90 to 100 watt series, 25 candle-power series.

SCHEDULE I.-E.

Westchester Lighting Company—Electric Arc and Incandescent Lighting, Borough of The Bronx.

Month.	Number of Lamps.*	Price Per Lamp Per Annum.	Outage Deductions.	Cost of Lighting.
January	†237	$100 00		$1,975 00
‡January	16	25 00		33 33
February	16	25 00	$0 55	32 78
March	16	25 00	07	33 26
April	16	25 00	4 11	29 22
May	16	25 00		33 33
June	16	25 00	19	33 14

Month.	Number of Lamps.*	Price Per Lamp Per Annum.	Outage Deductions.	Cost of Lighting.
July	16	25 00		33 33
August	16	25 00		33 33
September	16	25 00		33 33
October	16	25 00		33 33
November	16	25 00	07	33 26
December	16	25 00	07	33 26
Total			$5 06	$2,369 90

* 90 to 100 watt, 25 candle-power. † 450 watt. ‡ Arc lighting carried by the New York Edison Company February 1, 1906.

SCHEDULE I.-F.

Bronx Gas and Electric Company—Electric Arc Lighting, Borough of The Bronx.

Month.	Number of Lamps.*	Price Per Lamp Per Annum.	Outage Deductions.	Cost of Lighting.
January	671	$107 50	$23 27	$5 987 77
February	671	107 50	15 75	5,995 29
March	673	107 50	9 27	6,003 24
April	675	107 50	11 19	6,021 29
May	675	107 50	36 38	6,010 49
June	675	107 50	21 80	6,025 07
July	675	107 50	8 54	6,038 33
August	675	107 50	10 75	6,036 12
September	675	107 50	15 76	6,031 11
October	675	107 50	12 38	6,088 24
November	681	107 50	25 63	6,074 99
December	681	107 50	12 83	6,087 79
Total			$203 55	$72,399 73

* 400 watt alternating.

Total, Borough of The Bronx $222,047 52

SCHEDULE I.-G.

Total Cost of Lighting Public Electric Lamps in the Boroughs of Manhattan and The Bronx During the Year 1906.

	Outages Deducted.		Net.	
Borough of Manhattan.				
New York Edison Company—				
Arc	$636 12		$344,685 34	
Incandescent			1,891 53	
United Electric Light and Power Company	5 76		1,033 86	
		$641 88		$347,610 73
Borough of The Bronx.				
New York Edison Company—				
Arc	$786 55		$138,049 38	
Incandescent	10 71		9,228 51	
Westchester Lighting Company	5 06		2,369 90	
Bronx Gas and Electric Company	203 55		72,399 73	
		1,005 87		222,047 52
Total, Manhattan and The Bronx		$1,647 75		$569,658 25

Burning hours, 3,950 per year for all electric lamps.

All equipment, posts, lamps and erection supplied by company (21).

SCHEDULE

Cost of Lighting Public Street

Appropriation, "Lamps

Consolidated Gas Company—Gas

Month.		Number of Lamps.
January	Open flame	*218
	Mantle	†16,724
	Cluster	4
	Cluster	4
February	Open flame	214
	Mantle	16,717
	Cluster	4
	Cluster	4
March	Open flame	205
	Mantle	16,696
	Cluster	4
	Cluster	4
April	Open flame	203
	Mantle	16,614
May	Open flame	203
	Mantle	16,497
June	Open flame	186
	Mantle	16,424
July	Open flame	182
	Mantle	16,416
August	Open flame	177
	Mantle	16,516
September	Open flame	175
	Mantle	16,482
October	Open flame	159
	Mantle	16,418
November	Open flame	151
	Mantle	16,315 + 2
December	Open flame	123
	Mantle	16,050 + 2

* Open flame lamps, nominal candle power, 13.2. Consumption by contract, 3 cubic feet.
†Mantle lamps, nominal candle power, 60. Consumption by governor, 3½ cubic feet.
‡ Net.
§ Includes maintenance.

II.

Lamps by Companies.

and Lighting, 1906."

Lamps, Borough of Manhattan.

Price Per Lamp Per Annum.		Outage Deductions.	Cost of Lighting.		Repairs.	Total.
Maintenance.	Gas.		Maintenance.	Gas.		
‡$17 25		$128 60		§$34,699 96	$482 00	$35,181 96
‡24 75						
‡46 00						
‡25 00						
6 00	$8 89	56 65	$16,833 90	13,464 78		30,298 68
12 00	10 37					
21 00						
9 00						
6 00	8 89	57 07	16,822 18	14,880 95		31,703 13
12 00	10 37					
21 00						
9 00						
6 00	8 89	53 23	16,743 94	14,329 34		31,073 28
12 00	10 37					
6 00	8 89	56 84	16,678 83	14,703 97		31,382 80
12 00	10 37					
6 00	8 89	45 69	16,563 13	14,151 26	854 50	31,568 89
12 00	10 37					
6 00	8 89	39 96	16,491 30	14,615 93	808 05	31,915 73
12 00	10 37					
6 00	8 89	420 52	16,190 99	14,697 44	2,792 50	33,680 93
12 00	10 37					
6 00	8 89	72 16	16,545 72	14,193 01	1,462 00	32,200 73
12 00	10 37					
6 00	8 89	89 24	16,467 58	14,595 67	947 50	32,010 75
12 00	10 37					
6 00	8 89	113 55	16,429 86	14,030 27	1,130 50	31,590 63
12 00	10 37					
6 00	8 89	170 21	16,198 43	14,241 72	4,567 90	35,008 05
12 00	10 37					
		$1,303 72	$181,965 86	$192,604 30	$13,045 40	$387,615 56

See summary, 16,052—2 lamps at $12 charged by Consolidated Gas Company, from August 18 to November 30 on November bill, and December 1 to 31 on December bill.

Price of gas, 75 cents per 1,000 cubic feet per statute now in question in United States Courts. Gas, *22* candle power.

SCHEDULE

New Amsterdam Gas Company—Open

Month.	Number of Lamps.
January	†32
February	32
March	32
April	31
May	31
June	31
July	30
August	29
September	29
October	27
November	23
December	8
Total	

* Includes maintenance.
† Open flame gas lamp.
Consumption, 3 cubic feet per hour, by contract.

II.-A.

Flame Gas Lamps, Borough of Manhattan.

Price Per Lamp per Year.		Outage Deduction.	Cost of Lighting.		Repairs.	Total.
Maintenance.	Gas.		Maintenance.	Gas.		
.....	*$12 00	$0 06		*$31 94		$31 94
.....	*12 00	20		*31 80		31 80
.....	*12 00	10		*31 90		31 90
.....	*12 00	16		*30 84		30 84
.....	*12 00			*31 00		31 00
.....	*12 00	10		*30 90		30 90
.....	*12 00	03		*30 35		30 35
.....	*12 00	07		*29 92		29 92
.....	*12 00			*29 00		29 00
.....	*12 00			*28 86		28 86
.....	*12 00			*25 59		25 59
.....	*12 00			*22 08		22 08
.....		$0 72		*$354 18		$354 18

Price of gas and maintenance set by franchise per lamp per annum.
Price of maintenance estimated at $4 per year.
Price of gas, $0.67+ per thousand cubic feet.

SCHEDULE

Standard Gas Light Company—Open

Month.	Number of Lamps.
January	†12
February	12
March	12
April	11
May	11
June	12
July	12
August	12
September	12
October	11
November	11
December	7
Total	

* Includes maintenance.
† Open flame gas lamps.
Consumption, 3 cubic feet per hour, by contract.

H.-B.

Flame Gas Lamps, Borough of Manhattan.

Price Per Lamp per Year.		Outage Deduction.	Cost of Lighting.		Repairs.	Total.
Maintenance.	Gas.		Maintenance.	Gas.		
.....	*$12 7989			*$12 80		$12 80
.....	*12 88			*12 88		12 88
.....	*12 88			*12 88		12 88
.....	*12 88			*12 42		12 42
.....	*12 88			*11 81		11 81
.....	*12 88			*12 88		12 88
.....	*12 88			*12 88		12 88
.....	*12 88			*12 88		12 88
.....	*12 88			*12 88		12 88
.....	*12 88			*12 46		12 46
.....	*12 88			*11 81		11 81
.....	*12 88			*8 38		8 38
.....				*$146 96		$146 96

Price of gas and maintenance set by franchise per lamp.
Price of maintenance estimated at $4 per year.
Price of gas, 74 cents per thousand cubic feet.

SCHEDULE

Consolidated Gas Company—Mantle

Month.	Number of Lamps.
January	6,022
February	6,022
March	6,016
April	6,005
May	5,994
June	5,844
July	5,831
August	5,873
September	5,892
October	5,905
November	5,897
December	5,921
Total	

* Includes maintenance.

Mantle gas lamps, same specifications as Consolidated Gas Company, Borough of Manhattan.

II.-C.

Gas Lamps, Borough of The Bronx.

Price per Lamp per Year.		Outage Deduction.	Cost of Lighting.		Repairs.	Total.
Maintenance.	Gas.		Maintenance.	Gas.		
.....	*$24 75	$16 66		*$12,383 09		$12,383 09
$12 00	10 37	6 99	$6,021 60	4,789 11		10,810 11
12 00	10 37	5 77	6,017 78	5,296 95		11,314 73
12 00	10 37	5 54	6,012 86	5,116 71		11,129 57
12 00	10 37	4 60	5,996 73	5,277 58		11,274 31
12 00	10 37	6 70	5,959 62	4,979 53		10,939 15
12 00	10 37	3 10	5,832 41	5,134 06		10,966 47
12 00	10 37	44 02	5,812 51	5,171 04		10,983 55
12 00	10 37	4 22	5,882 89	5,020 42		10,903 31
12 00	10 37	14 44	5,886 66	5,199 22		11,085 88
12 00	10 37	20 84	5,876 25	5,024 69		10,900 94
12 00	10 37	31 00	5,879 46	5,213 31		11,092 77
.....		$163 90	$65,178 17	$68,605 71		$133,783 88

SCHEDULE

Central Union Gas Company—Open

Month.	Number of Lamps.
January	38
February	38
March	38
April	38
May	38
June	38
July	38
August	38
September	38
†October	38
November	38
December	38
Total	

* Includes maintenance.

Open flame gas lamps, same specifications as Consolidated Gas Company, Borough of Manhattan,

II.-D.

Flame Gas Lamps, Borough of The Bronx.

Price per Lamp per Year.		Outage Deduction.	Cost of Lighting.		New Posts.	Repairs.	Total.
Maintenance.	Gas.		Maintenance.	Gas.			
.....	*$14 89			*$47 15	$136 00	$5 50	$188 65
$8 89	6 00		$19 00	28 15		3 50	50 65
8 89	6 00		19 00	28 15		390 50	437 65
8 89	6 00		19 00	28 15			47 15
8 89	6 00		19 00	28 15			47 15
8 89	6 00		19 00	28 15			47 15
8 89	6 00		19 00	28 15		16 00	63 15
8 89	6 00		19 00	28 15		309 50	356 65
8 89	6 00		19 00	28 15		162 00	209 15
8 89	6 00		19 00	28 15		216 50	263 65
8 89	6 00		19 00	28 15		363 00	410 15
8 89	6 00		19 00	28 15		1,028 75	1,075 90
.....			$209 00	$356 80	$136 00	$2,495 25	$3,197 05

† Maintenance of open flame gas lamps billed by Consolidated Gas Company for February.

SCHEDULE

Northern Union Gas Company—Open

Month.	Number of Lamps.
January	54
February	54
March	54
April	54
May	54
June	54
July	54
August	54
September	54
†October	53
November	53
December	53
Total	

* Includes maintenance.

Open flame gas lamps, same specifications as Consolidated Gas Company, Borough of Manhattan.

II.-E.

Flame Gas Lamps, Borough of The Bronx.

Price Per Lamp per Year.		Outage Deduction.	Cost of Lighting.		Repairs.	Total.
Maintenance.	Gas.		Maintenance.	Gas.		
.....	*$14 89			*$67 00	$5 50	$72 50
$8 89	6 00		27 00	40 00	56 00	123 00
8 89	6 00		27 00	40 00		67 00
8 89	6 00		27 00	40 00		67 00
8 89	6 00		27 00	40 00		67 00
8 89	6 00		27 00	40 00		67 00
8 89	6 00		27 00	40 00	131 00	198 00
8 89	6 00		27 00	40 00	866 50	933 50
8 89	6 00		27 00	40 00	336 00	403 00
8 89	6 00		26 50	39 50	610 50	676 50
8 89	6 00		26 50	39 50	374 00	440 00
8 89	6 00		26 50	39 50	1,750 50	1,816 50
.....			$295 50	$505 50	$4,130 00	$4,931 00

† Maintenance of open flame gas lamps billed by Consolidated Gas Company.

SCHEDULE

Westchester Lighting Company—Open

Month.	Number of Lamps.
January	3
February	3
March	3
April	3
May	3
June	3
July	3
August	3
September	3
†October	3
November	3
December	3
Total	

* Includes maintenance.

Open flame gas lamps, same specifications as Consolidated Gas Company, in Borough of Manhattan.

II.-F.

Flame Gas Lamps, Borough of The Bronx.

Price Per Lamp per Year.		Outage Deduction.	Cost of Lighting.		Repairs.	Total.
Maintenance.	Gas.		Maintenance.	Gas.		
.....	*$14 89			*$3 72	$9 50	$13 22
$8 89	6 00		$1 50	2 22		3 72
8 89	6 00		1 50	2 22		3 72
8 89	6 00		1 50	2 22	4 50	8 22
8 89	6 00		1 50	2 22		3 72
8 89	6 00		1 50	2 22		3 72
8 89	6 00		1 50	2 22		3 72
8 89	6 00		1 50	2 22		3 72
8 89	6 00		1 50	2 22		3 72
8 89	6 00		1 50	2 22		3 72
8 89	6 00		1 50	2 22		3 72
.....			$16 50	$28 14	$14 00	$58 64

† Maintenance of open flame gas lamps billed by Consolidated Gas Company.

SCHEDULE

Total Cost of Lighting Public Gas Lamps in the

	Outage Deductions.		Cost of Lighting. Maintenance.	
Borough of Manhattan—				
Consolidated Gas Company	$1,303 72		$181,965 86	
New Amsterdam Gas Company	72			
Standard Gas Light Company				
		$1,304 44		$181,965 86
Borough of The Bronx—				
Consolidated Gas Company	$163 90		$65,178 17	
Central Union Gas Company			209 00	
Northern Union Gas Company			295 50	
Westchester Lighting Company			16 50	
		163 90		65,699 17
Total		$1,468 34		$247,665 03

Lighting hours, 3,950 for all gas lamps per annum.
All mantle lamps furnished, put in place and maintained by company

II.-6.

Boroughs of Manhattan and The Bronx During the Year 1906.

Cost of Lighting. Gas.		New Posts.		Repairs.		Total.	
$192,604 30				$13,045 40		$387,615 56	
354 18						354 18	
146 96						146 96	
	$193,105 44				$13,045 40		$388,116 70
$68,605 71						$133,783 88	
356 80		$136 00		$2,495 25		3,197 05	
505 50				4,130 00		4,931 00	
28 14				14 00		58 64	
	69,496 15		$136 00		6,639 25		141,970 57
	$262,601 59		$136 00		$19,684 65		$530,087 27

City supplies all open flame lamps, all posts, and pays for erection.

SCHEDULE III.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.
BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Cost of Lighting Public Street Lamps by Companies.

Appropriation, "Lamps and Lighting, 1906."

Welsbach Street Lighting Company of America—Naphtha Lamps, Borough of Manhattan.

Month.	Number of Lamps.	Price Per Lamp, Per Month. Mantle.	Outage Deductions.	Cost of Lighting.
January	970	$2 27	$12 09	$2,195 82
February	966	2 27	15 08	2,177 74
March	967	2 27	17 34	2,176 07
April	967	2 27	3 24	2,191 85
May	967	2 27	3 26	2,191 73
June	967	2 27	2 03	2,193 06
July	967	2 27	4 97	2,190 12
August	1,087	2 27	2 85	2,358 81
September	1,107	2 27	12 02	2,476 42
October	1,111	2 27	7 59	2,511 96
November	1,104	2 27	10 81	2,507 23
December	1,116	2 27	24 85	2,504 14
Total			$116 23	$27,674 95

SCHEDULE III.-A.

New York and New Jersey Globe Gas Light Company—Naphtha Lamps, Borough of Manhattan.

Month.	Number of Lamps.	Price Per Lamp, Per Month. Open Flame.	Outage Deductions.	Cost of Lighting.
January	107	$1 74	$0 11	$186 18
February	107	1 74		186 18
March	107	1 74	1 62	184 56
April	107	1 74	06	186 12

Month.	Number of Lamps.	Price Per Lamp, Per Month, Open Flame.	Outage Deductions.	Cost of Lighting.
May	107	1 74	17	186 01
June	107	1 74	11	186 07
July	107	1 74		186 18
August	46	1 74	2 24	72 14
*September				
*October				
*November				
*December				
Total			$4 31	$1,373 44

*Changed to mantle.
All equipment, posts, lamps and erection supplied by company (21).

Schedule III.-c.

Welsbach Street Lighting Company of America—Naphtha Lamps, Borough of The Bronx.

Month.	Number of Lamps.	Price Per Lamp, Per Month. Mantle.	Outage Deductions.	Cost of Lighting.
January	474	$2 27	$0 15	$1,075 98
February	473	2 27		1,074 12
March	477	2 27	44	1,078 54
April	476	2 27	30	1,080 98
May	476	2 27		1,080 52
June	476	2 27	45	1,080 07
July	484	2 27	14	1,084 63
August	798	2 27	1 32	1,211 46
September	1,172	2 27	15	2,180 19
October	1,176	2 27	66	2,663 66
November	1,730	2 27	1 89	3,309 41
December	*1,825	2 27	14 11	4,029 78
Total			$19 61	$20,949 34

*See Summary.

SCHEDULE III.-B.

New York and New Jersey Globe Gas Light Company—Naphtha Lamps, Borough of The Bronx.

Month.	Number of Lamps.	Price Per Lamp, Per Month. Open Flame.	Outage Deductions.	Cost of Lighting.
January	*1,238	$1 74	$0 29	$2,153 73
February	1,237	1 74	25	2,152 13
March	1,237	1 74	90	2,151 48
April	1,237	1 74	23	2,152,15
May	1,237	1 74		2,152 38
June	1,237	1 74		2,152 38
July	1,237	1 74	50	2,151 88
August	923	1 74	11	2,066 77
September	560	1 74	06	1,341 65
October	560	1 74		974 40
November	†277	1 74	12	481 51
December				
Total			$2 46	$19,930 46

*See Summary, one discontinued in January, = 1,237.
†Changed to mantle lamps.

SCHEDULE III.-D.

Total Cost of Lighting Public Naphtha Lamps in the Boroughs of Manhattan and The Bronx.

	Outage Deductions.		Total.	
Borough of Manhattan.				
Welsbach Street Lighting Company of America	$116 23		$27,674 95	
New York and New Jersey Globe Gas Light Company	4 31		1,373 44	
		$120 54		$29,048 39
Borough of The Bronx.				
Welsbach Street Lighting Company of America	$19,61		$20,949 34	
New York and New Jersey Globe Gas Light Company	2 46		19,930 46	
		22 07		40,879 80
Total Manhattan and The Bronx		$142 61		$69,928 19

SCHEDULE III.-E.

Total Cost of Lighting Public Street Lamps in the Boroughs of Manhattan and The Bronx.

	Manhattan.	The Bronx.	Total.
Electric Lighting	$347,610 73	$222,047 52	$569,658 25
Gas Lighting	388,116 70	141,970 57	530,087 27
Naphtha Lighting	29,048 39	40,879 80	69,928 19
Total	$764,775 82	$404,897 89	$1,169,673 71

Burning hours, 3,950 per annum.

SCHEDULE

DEPARTMENT OF WATER

BUREAU OF

BOROUGHS OF MANHAT

Cost of Electric Lighting

Appropriation, Lamps

Departments.	Manhattan.		
	New York Edison Company.	United Electric Light and Power Company.	Total.
Education	$39,626 00	$40,419 35	$80,045 35
Fire	8,733 00	597 60	9,330 60
Police	6,141 24		6,141 24
Charities		3,779 57	3,779 57
Correction	584 48		584 48
Health	2,533 22		2,533 22
Parks	2,044 51	514 57	2,559 08
Hospitals	2,721 01	14,388 17	17,109 18
Street Cleaning	2,591 59		2,591 59
Office of Borough President		3,459 36	3,459 36
Bridges	7 86	306 51	314 37
Williamsburg Bridge	3,843 92		3,843 92
City College	1,403 60		1,403 60
Normal College	527 66		527 66
Building Department	39 70		39 70
Public Buildings	15,547 77	126 73	15,674 50
Armories	20,615 85	749 02	21,364 87
Law	*.....	*.....	704 24
Totals	$106,961 41	$64,340 88	$172,006 53

* Supplied by Staats Zeitung Building.

N. B.—Rate for January, 10 cents per kilowatt hour, all companies.

Rate from February 1, 7½ cents per kilowatt hour, New York Edison and United Electric Light Electric Company, New York Staats Zeitung.

IV.

SUPPLY, GAS AND ELECTRICITY.

LAMPS AND GAS.

TAN AND THE BRONX.

in Public Buildings.

and Lighting, 1906.

The Bronx.					
New York Edison Company.	Westchester Lighting Company.	Bronx Gas and Electric Company.	Total.	Total. Manhattan and The Bronx.	Consumption, Kilowatt Hours.
$5,163 74	$423 50	$2 30	$5,589 54	$85,634 89	1,088,280.2
1,292 66	310 30		1,602 96	10,933 56	140,314.8
2,846 90	413 70	213 28	3,473 88	9,615 12	122,688.5
.....				3,779 57	48,894.8
.....				584 48	7,748.8
4,820 71			4,820 71	7,353 93	94,659.3
351 59	8 90	137 43	497 92	3,057 00	38,945.5
.....				17,109 18	222,988.5
349 10			349 10	2,940 69	37,998.6
.....				3,459 36	44,780.1
500 10			500 10	814 47	10,514.8
.....				3,843 92	48,647.4
.....				1,403 60	17,985.1
.....				527 66	6,800.8
.....				39 70	517.2
1,112 43	96 25		1,208 68	16,883 18	218,470.1
642 36			642 36	22,007 23	283,490.2
.....				704 24	7,042.4
$17,079 59	$1,252 65	$353 01	$18,685 25	$190,691 78	2,440,767.1

and Power Companies; 10 cents ped kilowatt hour, Westchester Lighting Company, Bronx Gas and

SCHEDULE

DEPARTMENT OF WATER SUPPLY,

BUREAU OF

BOROUGHS OF MANHATTAN

Cost of Gas Lighting in Public Buildings

Departments.	Consolidated Gas Company.	New Amsterdam Gas Company.	Standard Gas Light Company.
Education	$36,563 09	$4,161 96	$3,213 52
Fire	8,424 59	5,157 16	
Police	8,486 32	5,675 54	2,236 63
Charities	598 25	23,016 75	
Correction	3,707 46	4,734 68	
Health	2,081 92		
Parks	1,661 62		9 89
Hospitals	6,201 08		1,162 58
Street Cleaning	5,369 70	66 78	6 97
Office of Borough President	134 10		
City College	153 47		
Bridges	4 87		26 62
Sewers			
Board of Water Supply	31 64		
Public Buildings	15,635 10	3,435 08	77 55
Armories	792 37	12,194 01	
Markets	1,350 97	398 33	
Total	$91,286 55	$58,840 29	$6,733 78

Mainly five-foot open flame Bray, burners, with a number mantle lamps.

V.

GAS AND ELECTRICITY.

LAMPS AND GAS.

AND THE BRONX.

—Appropriation, Lamps and Lighting, 1906.

Mutual Gas Light Company.	Central Union Gas Company.	Northern Union Gas Company.	Westchester Lighting Company.	Bronx Gas and Electric Company.	Total, at 75c. Per Thousand.	Consumption, Cubic Feet.
$4,667 46	$4,087 88	$1,969 34	$226 72	$358 42	$55,248 39	73,664,600
.....	1,208 91	518 17	510 44	101 18	15,920 45	21,227,300
636 53	958 56	387 82		229 80	18,611 22	24,815,000
.....					23,615 00	31,486,800
.....					8,532 14	11,376,200
.....	511 80				2,593 72	3,458,300
454 88			51 15		2,177 54	2,903,400
.....		1,154 17			8,517 83	11,357,100
.....	336 29	181 64			5,961 38	7,948,400
.....					134 10	178,800
606 97					760 44	1,013,900
.....					31 49	42,000
.....	29 84	42 30		2 70	74 84	99,800
.....					31 64	42,200
200 70	144 45	2,424 36	21 60	39 89	21,978 73	29,305,000
.....		294 75			13,281 13	17,708,200
.....					1,749 30	2,332,400
$6,566 54	$7,277 73	$6,972 55	$809 91	$731 99	$179,219 34	238,959,400

Total Cost of Lighting Public Buildings in Manhattan and The Bronx.

Electric	$190,691 78
Gas	179,219 34
	$369,911 12

SCHEDULE VI.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Cost of Electric Power to Public Buildings.

Appropriations, Heat and Power, City Departments, County Buildings and Offices and Revenue Bond Fund, Heat and Power, City Departments, County Buildings and Offices.

Department.	Manhattan. New York Edison Company.	Manhattan. United Electric Light and Power Company.	The Bronx. New York Edison Company.	Total. Departments.	Consumption, Kilowatt-Hours.
Education	$4,027 46	$2,192 38	$1,160 85	$7,380 69	123,011.5
Fire	3,317 69			3,317 69	55,294.8
Police	239 89			239 89	3,998.2
Correction	4 95			4 95	82.5
Health	791 03		926 40	1,717 43	28,623.8
Parks	36 97			36 97	616.2
Hospitals	145 86	50 76		196 62	3,277.0
Street Cleaning	386 76		30 00	416 76	6,946.0
City College	66 18			66 18	1,103.0
Bridges		103 80	174 00	277 80	4,630.0
Public Buildings	944 02		06	944 08	15,734.7
Armories	386 55			386 55	6,442.5
	$10,347 36	$2,346 94	$2,291 31	$14,985 61	249,760.2

Note—Rate, 6 cents per kilowatt-hour.

Amounts chargeable to:

Appropriation—Heat and Power, City Departments, County Buildings and Offices	$9,512 00
Revenue Bond Fund—Heat and Power, City Departments, County Buildings and Offices	5,473 61
	$14,985 61

SCHEDULE VII.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Cost of Steam Heat in Public Buildings.

Appropriation, Heat and Power, City Departments, County Buildings and Offices, and Revenue Bond Fund, Heat and Power, City Departments, County Buildings and Offices.

Department.	Amount.
Public Buildings	$11,354 21
Armories	294 06
Bridges	263 52
Education	3,120 68
	$15,032 47

Amount chargeable to:

Appropriation, Heat and Power, City Departments, County Buildings and Offices	$13,953 27
Revenue Bond Fund—Heat and Power, City Departments, County Buildings and Offices	1,079 20
	$15,032 47

Rate varying with consumption per 1,000 pounds steam.

SCHEDULE VIII.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Bureau Expenses.

Appropriation, Lamps and Lighting, 1906.

Miscellaneous supplies	$1,292 82
Special Electric Inspection of buildings	337 50
Inspectors' disbursements, car fares, etc.	1,483 34
Storehouse, Perry street	1,268 21
Locomobile storage, supplies, etc.	804 08
Automobile storage, supplies, etc.	974 23
Gas regulators, rental, etc.	7,778 51
Cartages, wagon and auto hire	1,954 43
Welsbach lamp Inspections in public buildings	762 45

Photometric expenditures, rent, Inspectors' disbursements, etc.	3,347 93
Lamp brackets (C. P. Morris)	108 00
Total	$20,111 50

Liabilities—Chargeable to Lamps and Lighting.

Carpenter work (book case)	20 00
Bills paid	$20,111 50
Liabilities	20 00
Total Bureau expenses	$20,131 50

SCHEDULE. IX.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Salaries of Lighters of Markets, etc.

Appropriation, Lamps and Lighting, 1906.

Name and Position.	Per Month.	Per Year.
Valentine Pearsall, Lamplighter	$10 00	$120 00
Owen Blaine, Lamplighter	10 00	120 00
John A. Bain, Lamplighter	10 00	120 00
*William F. Dowling, Lamplighter	10 00	10 00
†Owen Battke, Lamplighter	10 00	60 00
Edward L. McGuckin, Lamplighter	30 00	360 00
John H. Kriederwolf, Cleaner	20 00	240 00
‡William H. Multer, Locomobile Engineer		230 00
Total		$1,260 00

*Dropped January 31, 1906.
†Appointed July 1, 1906.
‡Dropped April 2, 1906.

SCHEDULE X.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Salaries of Office Force and Inspectors—Appropriation, Salaries, Lighting and Electricity, 1906.

Name of Employee and Position.	Salary. Per Month.		Per Year.	Remarks.
Dominique F. Verdenal, Clerk...	$125 00	$137 50	$1,575 00	Increase to $1,650 per annum, July 1, 1906.
Carolyn Marvin, Stenographer and Typewriter.....	100 00		1,200 00	
Mary McElligott, Stenographer and Typewriter.....	87 50		1,050 00	
Anna McEnroe, Stenographer and Typewriter	75 00	87 50	962 50	Increase to $1,050 per annum, August 1, 1906.
Charles J. Friedrich, Junior Clerk and Clerk.....	50 00	62 50	725 00	Increase to $750 per annum, March 1, 1906.
Michael J. Daly, Junior Clerk and Clerk	50 00	62 50	725 00	Increase to $750 per annum, March 1, 1906.
William Kalkbrenner, Junior Clerk and Clerk.....	50 00	62 50	622 92	Increase to $750 per annum, March 1, 1906. Transferred to Queens, November 12, 1906.
Alex. T. S. Williams, Architectural Draughtsman	125 00		1,500 00	
John Ashmead, Draughtsman's Helper	75 00	87 50	962 50	Increase to $1,050 per annum, August 1, 1906.
Andrew Biageni, Draughtsman's Helper	87 50		95 22	Appointed August 21; dropped September 22.
James Dougherty, Draughtsman's Helper	87 50		254 03	Appointed October 4.
Fred. J. McGuire, General Inspector, Public Building Lighting	150 00		1,800 00	
Primo Porcella, General Inspector	125 00	150 00	1,625 00	Increase to $1,800 per annum, August 1, 1906.
William G. Quirk, General Inspector, Street Lighting.....	125 00	150 00	1,625 00	Increase to $1,800 per annum, August 1, 1906.
Edward F. Quinn, Inspector of Lamps and Gas.....	100 00		1,200 00	
Nicholas C. Conlon, Inspector of Lamps and Gas.....	100 00		1,200 00	
Edward J. McKavanagh, Inspector of Lamps and Gas.....	100 00		300 00	Dropped April 1.
Louis Arnstein, Inspector of Lamps and Gas.....	100 00		1,200 00	
Charles E. Hartwell, Inspector of Lamps and Gas.....	100 00		1,200 00	
William F. J. Dolan, Inspector of Lamps and Gas.....	100 00		1,200 00	

Name of Employee and Position.	Salary. Per Month.	Per Year.	Remarks.
Charles E. Keefe, Inspector of Lamps and Gas	100 00	1,200 00	
Martin J. Moran, Inspector of Lamps and Gas	100 00	1,200 00	
Michael Gilmore, Inspector of Lamps and Gas	100 00	1,200 00	
Thomas Gilligan, Inspector of Lamps and Gas	100 00	1,200 00	
Thomas Kelaher, Inspector of Lamps and Gas	100 00	1,200 00	
Frank Whalen, Inspector of Lamps and Gas	100 00	1,200 00	
Thomas J. Farrell, Inspector of Lamps and Gas	100 00	1,000 00	Ten months.*
Thomas L. Reilly, Inspector of Lamps and Gas	100 00	1,200 00	
Nicholas I. Clarkin, Inspector of Lamps and Gas	100 00	1,000 00	Ten months.*
William Reidy, Inspector of Lamps and Gas	100 00	1,000 00	Ten months.*
Pierce J. Whalen, Inspector of Lamps and Gas	100 00	1,000 00	Ten months.*
Max Hartvigsen, Inspector of Lamps and Gas	100 00	1,200 00	
James J. Fitzpatrick, Inspector of Lamps and Gas	100 00	1,200 00	
John W. Prendergville, Inspector of Lamps and Gas	100 00	1,200 00	
James O'Meara, Inspector of Lamps and Gas	100 00	1,200 00	
Ernest C. White, Inspector of Lamps and Gas	100 00	1,200 00	
Robert D. Tape, Inspector of Lamps and Gas	100 00	1,200 00	
Charles Krauss, Inspector of Lamps and Gas	100 00	1,200 00	
Ernest Hemmesfahr, Chauffeur	125 00	520 16	Dropped May 5.
Thomas Kletchka, Chauffeur	125 00	975 81	Appointed May 7.
Total		$43,318 14	

*Inspectors of Lamps and Gas transferred to Revenue Bond Fund for Department of Water Supply, Gas and Electricity, to Provide for new positions in the force of Chief Engineer of Light and Power, November and December.

Name of Employee and Position.	Salary. Per Month.	Per Year.	Remarks.
Hugh F. McLaughlin, General Inspector, Borough of The Bronx	$125 00	$1,500 00	

Chargeable to Appropriation, Office of Deputy Commissioner and Water Register, Borough of The Bronx.

SCHEDULE XI.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Salaries, New Positions in the Force of the Chief Engineer of Light and Power.

Revenue Bond Fund for Department of Water Supply, Gas and Electricity, to Provide for New Positions in the Force of Chief Engineer of Light and Power.

	Salary.	
	Monthly.	Yearly.
1 Clerk (5 months)	$212 50	$1,062 50
1 Junior Clerk (2 months 7 days)	50 00	111 29
9 Inspectors of Lamps and Gas, at $100 per month each, from October 29 to December 31, 1906 (2 months 3 days)	900 00	1,887 12
2 Inspectors of Lamps and Gas, at $100 per month each, from October 30 to December 31, 1906 (2 months 2 days)	200 00	412 90
11 Inspectors of Lamps and Gas, at $100 per month each, November and December (2 months)	1,100 00	2,200 00
*1 Clerk, month of December, Borough of Queens (1 month)	137 50	137 50
*1 Clerk, month of December, Borough of Queens (1 month)	62 50	62 50
Total		$5,873 81

*Salary paid out of above fund during December owing to lack of funds in Salaries, Lighting and Electricity, 1906, Borough of Queens.

SCHEDULE XII.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Salaries, Office of Chief Gas Examiner.

Appropriation, Office of Chief Gas Examiner.

Name of Employee and Position.	Salary. Per Month.	Salary. Per Year.	Remarks.
Edward G. Love, Chief Gas Examiner.....	$250 00	$3,000 00	
William R. Birdsley, Gas Examiner.....	100 00	1,200 00	
Richard H. Gaines, Gas Examiner.....	100 00	333 33	Transferred April 10, 1906.
Samuel Hirschowitz, Gas Examiner.....	100 00	1,200 00	
William T. Koster, Gas Examiner.....	100 00	1,200 00	
William Richardson, Gas Examiner.....	100 00	1,177 42	Appointed January 7, 1906.
Bernard W. Knoring, Gas Examiner.....	100 00	1,154 84	Appointed January 14, 1906.
Eugene A. C. Dupin, Gas Examiner.....	100 00	1,177 42	Appointed January 7, 1906.
Bernard C. Baumgarten, Gas Examiner.....	100 00	1,132 26	Appointed January 21, 1906.
Andrew J. Cassassa, Gas Examiner.....	100 00	1,067 86	Appointed February 9, 1906.
Edward I. Connlin, Gas Examiner.....	100 00	870 00	Appointed April 10, 1906.
Total.....		$13,513 13	

SCHEDULE XIII.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Photometric Station Expenses.

Revenue Bond Fund for Operation and Maintenance of Nine Photometric Stations and for Salaries of Gas Examiners, Authorized September 1, 1906.

Original Revenue Bond Fund		$20,000 00
Expenditure during 1905	$9,925 38	
Expenditure during 1906	620 60	
Liabilities—		
Apparatus	4,074 00	
Fitting up	174 00	
Total expense		14,793 98
Balance to the credit of Revenue Bond Fund, December 31, 1906		$5,206 02

SCHEDULE

DEPARTMENT OF WATER SUPPLY,

BUREAU OF

BOROUGHS OF MANHAT

Summary of Expend

Company.	Outstanding Liabilities, 1906 (Estimated).				Appropriation, Heat and Power.
	Streets and Parks.	Repairs.	Public Buildings.	Total.	
New York Edison Company	$37,487 19		$17,815 98	$55,303 17	$1,215 58
United Electric Light and Power Company	951 36		10,461 06	11,412 42	284 59
Westchester Lighting Company (electric)	2,008 33		146 60	2,154 93	
Westchester Ligbting Company (gas)	28 14	$14 00	809 91	852 05	
Bronx Gas and Electric Company (electric)	30 08		353 01	583 09	
Bronx Gas and Electric Company (gas)			731 99	731 99	
Consolidated Gas Company	261,210 01	482 00	91,286 55	352,978 56	
New Amsterdam Gas Company	31 94		58,840 29	58,872 23	
Standard Gas Light Company	12 80		6,733 78	6,746 58	
Mutual Gas Light Company			6,566 54	6,566 54	
Central Union Gas Company	356 80	535 50	7,277 73	8,170 03	
Northern Union Gas Company	505 23	61 50	6,972 55	7,539 28	
Welsbach Street Lighting Company of America	3 00			3 00	
New York and New Jerscy Globe Gas Light Company					
Staats-Zeitung Building					
	$302,624 88	$1,093 00	$207,995 99	$511,713 87	$1,500 17

XIV.

GAS AND ELECTRICITY.

LAMPS AND GAS.

TAN AND THE BRONX.

itures and Liabilities.

Vouchers Chargeable to Appropriations and Fund Accounts, 1906.					
Streets and Parks.	Repairs.	Public Buildings.	Total.	Appropriation, Heat and Power.	Revenue Bond Fund, Heat and Power.
$456,367 57		$106,225 02	$562,592 59	$6,714 77	$4,708 32
82 50		53,879 82	53,962 32	1,297 06	765 29
361 57		1,106 05	1,467 62		
16 50			16 50		
72,369 65			72,369 65		
.....					
247,144 03	$12,563 40		259,707 43		
322 24			322 24		
134 16			134 16		
.....					
209 00	2,095 75		2,304 75		
295 77	4,068 50		4,364 27		
48,621 29			48,621 29		
21,303 90			21,303 90		
.....		704 24	704 24		
$847,228 18	$18,727 65	$161,915 13	$1,027,870 96	$8,011 83	$5,473 61

SCHEDULE XV.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND GAS.

BOROUGHS OF MANHATTAN AND THE BRONX.

Recapitulation, 1906—Appropriation Accounts.

Appropriation.	Funds Available.	Expenditures.	Estimated Balance.	
Lamps and Lighting, 1906	$1,586,567 00		$1,586,567 00	
Vouchers Issued—				
Streets and Parks		$847,228 18		
Repairs		18,727 65		
Public Buildings		161,915 13		
Bureau Expenses		20,111 50		
Salaries, Lighters of Markets, etc		1,260 00		
			1,049,242 46	
Actual balance			$537,324 54	
Outstanding Liabilities—				
Streets and Parks		$302,624 88		
Repairs		1,093 00		
Public Buildings		207,995 99		
Bureau Expenses		20 00		
			511,733 87	
				*$25,590 67
Salaries, Lighting and Electricity, 1906	84,000 00		$84,000 00	
Vouchers Issued—				
Office and Inspectors		$43,318 14	43,318 14	
				†40,681 86
Office of Chief Gas Examiner, 1906	13,800 00		$13,800 00	
Vouchers Issued—				
Salaries		13,513 13	13,513 13	
				286 87
Revenue Bond Fund, for Department of Water Supply, Gas and Electricity, to Provide for New Positions in Force of Chief Engineer of Light and Power.	10,850 00		$10,850 00	
Vouchers Issued—				
‡Salaries, Clerks, Inspectors, etc		5,873 81	5,873 81	
				4,976 19
Heat and Power, City Departments, County Buildings and Offices, 1906	29,852 82		$29,852 82	

Appropriation.	Funds Available.	Expenditures.	Estimated Balance.	
Vouchers Issued—				
Electric Power to Public Buildings...		8,011 83		
Steam Heat to Public Buildings.....		13,953 27		
			21,965 10	
Actual balance.....			$7,887 72	
Outstanding Liabilities—				
Electric Power to Public Buildings....		$1,500 17	1,500 17	
				6,387 55
Revenue Bond Fund, City Departments, County Buildings and Offices.....	16,000 00		$16,000 00	
Vouchers Issued—				
Electric Power to Public Buildings...		5,473 61		
Steam Heat to Public Buildings.....		1,079 20		
			6,552 81	
				9,447 19
	$1,741,567 82	$1,653,699 49		$87,370 33
Revenue Bond Fund for Operation and Maintenance of Nine Photometric Stations and for Salaries of Gas Examiners, authorized September 1, 1905...	$20,000 00		$20,000 00	
Vouchers issued		$10,545 98	10,545 98	
Actual balance			$9,454 02	
Liabilities outstanding		4,248 00	4,248 00	
				$5,206 02
	$20,000 00	$14,793 98		$5,206 02

* This does not include interest charges, $1,030.75, which were paid out of Lamps and Lighting, 1906, by Comptroller in settlement, May 20, 1907.

† This balance applies to both Bureau of Lamps and Gas and Electrical Bureau, the expenditures of which latter Bureau are unknown to the former.

‡ Memorandum of expenditures from this Revenue Bond Fund:

Clerks and Inspectors assigned to Manhattan and The Bronx.....	$3,444 77
Inspectors assigned to Brooklyn.....	1,019 36
Inspectors assigned to Queens.....	1,000 00
Inspectors assigned to Richmond.....	409 68
	$5,873 81

SCHEDULE

DEPARTMENT OF WATER SUPPLY,

BUREAU OF LAMPS

BOROUGH OF

Cost of Lighting Public Lamps, Repairs,

Appropriations, Lamps

Edison Electric Illuminating Company—Electric

Month	Number of Lamps.
January	4,335
February	4,335
March	4,335
April	4,329
May	4,328
June	4,328
July	4,377
August	4,378
September	4,398
October	4,393
November	4,393
December	4,416—1
Total	

I.

GAS AND ELECTRICITY.

AND LIGHTING.

BROOKLYN.

etc., to Same, by Companies, etc.

and Lighting, 1906, etc.

Lighting, 250, 325 and 450 Watt Lamps.

Price per Lamp per Year.				Outage Deductions.	Cost of Lighting.	Repairs.	Company's Total.
250-Watt.	325-Watt.	375-Watt.	400-Watt.				
$65 00	$90 00	$94 00	$96 00	$82 11	$32,814 03		$32,814 03
62 05	90 00			58 67	29,280 54		29,280 54
62 05	90 00			148 39	32,299 06		32,299 06
62 05	90 00			86 52	31,303 99		31,303 99
62 05	90 00			145 19	32,300 05		32,300 05
62 05	90 00			122 75	31,260 36		31,260 36
62 05	90 00			142 48	32,352 63		32,352 63
62 05	90 00		100 00	265 48	32,069 60		32,069 60
62 05	90 00		100 00	99 09	31,731 42		31,731 42
.....	90 00		100 00	111 42	32,807 53		32,807 53
.....	90 00		100 00	112 16	32,130 92		32,130 92
.....	90 00		100 00	33 16	33,757 09		33,757 09
.....				$1,407 42	$384,107 22		$384,107 22

SCHEDULE I.-A.

Flatbush Gas Company—Electric Lighting, 425 Watt Lamps.

Month.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Total.
January	725	$97 50	$10 14	$5,929 23	$5,929 23
February	725	97 50		5,939 37	5,939 37
March	725	97 50		5,939 37	5,939 37
April	725	97 50		5,939 37	5,939 37
May	725	97 50		5,939 37	5,939 37
June	725	97 50		5,939 37	5,939 37
July	727	97 50		5,941 50	5,941 50
August	733	97 50		5,977 78	5,977 78
September	739	97 50	20 83	5,999 03	5,999 03
October	739	97 50	5 34	6,047 78	6,047 78
November	739	97 50	4 80	6,048 31	6,048 31
December	774	97 50	40 06	6,115 29	6,115 29
			$81 17	$71,755 77	$71,755 77
Total cost of electric lighting, street lamps, 1906					$455,862 99

Burning hours, 3,950 per annum.
Equipment and service furnished by company.

SCHEDULE II.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF BROOKLYN.

Cost of Lighting Public Lamps, Repairs, etc., to Same, by Companies, etc.

Appropriations, Lamps and Lighting, 1906, etc.

Brooklyn Union Gas Company—Open Flame Gas Lamps.

1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total.
January	5,704	*$14 89	$8 67	$7,213 42	$362 00	$7,575 42
February	5,701	14 89	4 12	6,511 96	239 00	6,750 96
March	5,641	14 89	6 32	7,133 72	467 00	7,600 72
April	5,641	14 89	4 10	6,899 37	74 50	6,973 87

*Lamps and lamp-posts furnished by City and erected at City's expense, but maintained by company. Price still unsettled, but probably will be adjusted at less than this price.

1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total.
May	5,640	14 89	1 26	7,131 40	73 50	7,204 90
June	5,640	14 89	16 89	6,884 85	91 00	6,975 85
July	5,633	14 89	11 26	7,117 66	326 00	7,443 66
August	†4,468	14 89	7 67	6,816 56	2,179 00	8 995 56
September	1,974	14 89	8 32	3,922 00	1,746 50	5,668 50
October	8	14 89		638 33	2,001 50	2,639 83
November	6	14 89		8 32	2,256 00	2,264 32
December	2	14 89		4 97	1,897 00	1,901 97
			$68 61	$60,282 56	$11,713 00	$71,995 56

†Change begun to mantle lamps.
Open-flame lamps, 3 cubic feet per hour; nominal candle-power, 13.2; 22 candle-power gas.

Schedule II.-a.

Brooklyn Union Gas Company—Welsbach Gas Lamps.

1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total
January	5,948	*$24 29	$8 11	‡$12,300 92		$12,301 92
February	5,957	†10 37	1 34	†5,147 84		5,147 84
March	6,052	10 37	1 39	5,229 93		5 229 93
April	6,052	10 37	1 39	5,158 12		5,158 12
May	6,052	10 37	2 61	5,330 06		5,330 06
June	6,051	10 37	3 66	5,157 27		5,157 27
July	6,051	10 37	3 14	5,329 18		5,329 18
August	7,128	10 37	1 98	6,277 70		6,277 70
September	9,810	10 37	6 52	8,361 06		8,361 06
October	11,822	10 37	1 14	10,113 58		10,113 58
November	11,939	10 37	3 62	10,378 11		10 378 11
December	12,129	10 37	6 72	11,031 67		11,031 67
			$41 62	$89,815 44		$89,815 44

*Gas and maintenance. Lamps furnished and maintained by company. Lamp-posts supplied, erected and connected at expense of City. For maintenance, see Schedule II.-e.
†Gas only.
‡Gas and maintenance.

SCHEDULE II.-B.

Brooklyn Borough Gas Company—Open Flame Gas Lamps.

1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions. (Deducted.)	Cost of Lighting. (Net.)	Repairs.	Total.
January	*55	†$14 89		$69 56		$69 56
February	55	14 89		69 56		69 56
March	55	14 89		69 56		69 56
April	58	14 89		73 35		73 35
May	58	14 89		70 98		70 98
June	58	14 89		73 35		73 35
July	58	14 89		73 35		73 35
August	‡58	14 89		73 35		73 35
September	2	14 89		7 10		7 10
October		14 89		1 88		1 88
November						
December					$780 00	780 00
				$582 04	$780 00	$1,362 04

*Open-flame lamps.

†Gas $8.89 and maintenance $6.

‡Change begun to mantle.

Same arrangement as to supply and erection as with the Brooklyn Union Gas Company as to open-flame lamps and lamp-posts.

SCHEDULE II.-C.

Brooklyn Borough Gas Company—Mantle Gas Lamps.

1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total.
September	77	*$10 37		$57 26		$57 26
October	77	10 37		66 20		66 20
November	77	†10 37		65 63		65 63
December	159	10 37		78 26		78 26
				$267 35		$267 35

*Gas.

†Maintenance $13.92 or $13.32.

Same arrangement as to supply of lamps, lamp-posts, etc., as with Brooklyn Union Gas Company for mantle lamps.

SCHEDULE II.-D.

Kings County Lighting Company—Open Flame Gas Lamps.

1906	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Resets to Grade.	Total.
January	4,549	$28 00				
February	4,549	28 00				
March	4,550	28 00	$95 04	$31,314 00	$16 50	$31,330 50
April	4,550	28 00				
May	4,550	28 00			47 50	47 50
June	4,550	28 00	21 40	31,741 20	531 70	32,272 90
July	4,550	28 00			157 50	157 50
August	4,550	28 00			332 50	332 50
September	4,550	28 00	48 01	32,063 63	52 50	32,116 13
October	4,550	28 00			15 00	15 00
November	4,550	28 00			30 00	30 00
December	4,550	28 00	121 90	31,989 74	722 70	32,712 44
			$286 35	$127,108 57	$1,905 90	$129,014 47

Special contract. Lamps and lamp-posts supplied and erected by City; maintained by company. All changes of mains due to change of grade paid by City.

SCHEDULE II.-E.

New York and New Jersey Globe Gas Light Company—Welsbach Gas Lamps.

1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total
January						
February	5,957	$13 92	$1 95	$6,903 61		$6,903 61
March	6,052	13 92	1 83	7,005 91		7,005 91
April	6,052	13 92	1 89	7,018 43		7,018 43
May	6,052	13 92	3 44	7,016 88		7,016 88
June	6,051	13 92	4 99	7,015 21		7,015 21

1906	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total.
July	6,051	13 92	4 26	7,014 90		7,014 90
August	7,128	13 92	2 92	7,297 53		7,297 53
September	9,861	13 92	10 24	9,930 56		9,930 56
October	11,899	*13 32 13 98	4 33	12,598 93		12,598 93
November	12,016	13 32 13 98	5 40	13,270 80		13,270 80
December	12,288	13 32 13 98	9 71	13,459 02		13,459 02
			$50 96	$98,531 78		$98,531 78

*Change in rate due to increasing number of lamps.

Maintenance and supply of mantle gas lamps.

Schedule II.-f.

RECAPITULATION.

	Open Flame.	Welsbach.	Repairs.	Total.
Brooklyn Union Gas Company	$60,282 56	$89,815 44	$11,713 00	$161,811 00
Brooklyn Borough Gas Company	582 04	267 35	780 00	1,629 39
Kings County Lighting Company	127,108 57			129,014 47
Reset to grade	1,905 90			
New York and New Jersey Globe Gas Light Company		98,531 78		98,531 78
Total gas lighting, street lamps, 1906	$189,879 07	$188,614 57	$12,493 00	$390,986 64

All lamps burn 3,950 hours per annum.

SCHEDULE III.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF BROOKLYN.

Cost of Lighting Public Lamps, Repairs, etc., to Same, by Companies, etc.

Appropriations, Lamps and Lighting, 1906, etc.

New York and New Jersey Globe Gas Light Company—Plain Naphtha Lamps.

Months, 1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total.
January	12	$20 88		$20 88		$20 88
February	12	20 88		20 88		20 88
March	12	20 88		20 88		20 88
April	12	20 88		20 88		20 88
May	12	20 88		20 88		20 88
June	12	20 88		20 88		20 88
July	12	20 88		20 88		20 88
August	12	20 88		20 88		20 88
September	12	20 88		20 88		20 88
October	12	20 88		20 88		20 88
November	12	20 88		20 88		20 88
December	12	20 88		20 88		20 88
Total				$250 56		$250 56

Open flame naphtha lamps on Barren Island only.
All equipment supplied and maintained by company

SCHEDULE III.-A.

Welsbach Street Lighting Company of America—Naphtha Mantle Lamps.

Months, 1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total.
January	480	$27 24		$1,094 87		$1,094 87
February	480	27 24		1,089 60		1,089 60
March	480	27 24		1,089 60		1,089 60
April	480	27 24		1,089 60		1,089 60
May	480	27 24		1,089 60		1,089 60
June	480	27 24		1,089 60		1,089 60
July	481	27 24		1,091 87		1,091 87

Months, 1906.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.	Repairs.	Total
August	481	27 24		1,091 87		1,091 87
September	481	27 24		1,091 87		1,091 87
October	481	27 24		1,091 87		1,091 87
November	481	27 24		1,091 87		1,091 87
December	481	27 24		1,091 87		1,091 87
				$13,094 09		$13,094 09
Total, 1906						$13,344 65

All equipment supplied and maintained by company.

SCHEDULE III.-B.

RECAPITULATION.

Cost of Lighting Street Lamps During 1906.

Electric, Schedule I	$455,862 99
Gas, Schedule II	376,587 74
Naphtha, Schedule III	13,344 65
Repairs, Schedule II	14,398 90
	$860,194 28

SCHEDULE IV.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF BROOKLYN.

Cost of Electric Lighting in Public Buildings, by Companies and Departments

Appropriation, Lamps and Lighting, 1906, etc.

Departments	Edison Electric Illuminating Company, *9½c Per Kilowatt Hour.	Flatbush Gas Company, 10c Per Kilowatt Hour	Total, Departments.	Consumption, Kilowatt Hours.
Administration Buildings	$22,340 47		$22,340 47	228,658.9
Armories	6,905 91		6,905 91	70,458.9
Education	20,388 67	$2,002 09	22,390 46	226,044.1
Police	6,854 86	93 07	6,947 93	71,372.0
Fire	4,105 16	338 29	4,443 45	45,515.9
Charities	4,071 15		4,071 15	41,665.3
Health	793 75	3,501 41	4,295 16	43,140.8
Parks	2,230 96		2,230 96	22,992.2

Departments.	Edison Electric Illuminating Company, *9½c Per Kilowatt Hour.	Flatbush Gas Company, 10c Per Kilowatt Hour.	Total, Departments.	Consumption, Kilowatt Hours.
Street Cleaning	4,623 61		4,623 61	47,380.6
Baths and Comfort Stations	6,030 24		6,030 24	61,925.0
Pumping Stations	363 89		363 89	3,748.1
	$78,708 67	$5,934 86		
Total cost of electric lighting in public buildings for year 1906			$84,643 53	862,901.8

* Rate, 12 cents per kilowatt hour for month of January; 9½ cents per kilowatt hour from February 1.

SCHEDULE IV.-A.

Cost of Gas Lighting in Public Buildings, by Companies and Departments.

Appropriations, Lamps and Lighting, 1906, etc.

Departments.	Brooklyn Union Gas Company. 75c. per 1,000 Cubic Feet.	*Kings County Lighting Company. $1 per 1,000 Cubic Feet.	Flatbush Gas Company. 75c. per 1,000 Cubic Feet.	Brooklyn Borough Gas Company. 75c. per 1,000 Cubic Feet.	Total Departments.	Consumption, Cubic Feet.
Administration Buildings	$3,953 45				$3,953 45	7,937,900
Armories	12,323 04				12,323 04	16,430,700
Education	13,432 15	$577 10	$869 11	$249 27	15,127 63	19,977,800
Police	9,896 48	253 00	301 60	414 83	10,865 91	14,493,500
Fire	6,283 17	582 20	309 26	574 77	7,749 40	10,138,500
Charities	683 50		851 11	174 53	1,709 14	2,278,800
Corrections	2,144 86				2,144 86	2,859,800
Health	210 90		2,938 32		3,149 22	4,199,000
Street Cleaning	479 33	52 10	4 21		535 64	696,800
Parks	132 23				132 23	176,300
Baths and Comfort Stations	548 69				548 69	731,600
Sewers	118 81				118 81	158,400
Pumping Stations	2,159 40			789 62	2,949 02	3,932,000
Photometric Stations	41 90	13 80			55 70	69,700
Water Supply, Gas and Electricity	426 57				426 57	568,800
Disciplinary Training School		1,794 80			1,794 80	1,794,800
Total	$54,834 48	$3,273 00	$5,273 61	$2,203 02	$65,584 11	86,354,400

* Under special long term contract.

Total cost of electric lighting in public buildings, 1906	$84,643 23
Total cost of gas lighting in public buildings, 1906	65,584 11
Total cost of gas and electric lighting in public buildings, 1906	$150,227 34

SCHEDULE V.

Cost of Electric Current Supplied for Power to the Departments, by Departments.

Appropriation, Heat and Power, City Departments, County Buildings and Offices, 1906.

Departments.	Edison Electric Illuminating Company	Consumption, Kilowatt Hours.
Education	*$5,345 07	88,173.3
Administration Buildings	3,582 06	59,270.0
Baths and Comfort Stations	3,583 58	59,415.4
Police	* 458 38	7,588.1
Fire	247 17	4,094.8
Charities	211 57	3,504.2
Pumping Stations	86	13.8
Total	$13,428 69	222,059.6

* Rate, 6.4 cents per kilowatt hour for January, 1906; 6 cents per kilowatt hour from February, 1906.

SCHEDULE VI.

Bureau Expenses.

Appropriations, Lamps and Lighting, and Supplies and Contingencies.

	Lamps and Lighting, 1906.	Supplies and Contingencies, 1906.	Total.
Transportation	$428 26	$97 75	$526 01
Horse expense and hire	2,885 67		2,885 67
Rentals of and telephone service for photometric stations	1,049 27		1,049 27
Gas regulators	660 92		660 92
Office supplies and equipment	660 86	48 93	709 79
Storehouse rentals	1,000 00		*1,000 00
Total	$6,684 98	$146 68	$5,831 66

* Discontinued January 1, 1907.

SCHEDULE VII.

Salaries.

Appropriation, Salaries, Lighting and Electricity, 1906

Employees.	Service During Year.	Rate.	Amount.
1 Assistant Engineer	1 year	$3,000 00 per annum	*$3,000 00
1 Clerk	1 year	1,500 00 per annum	1,500 00
1 Clerk	1 year	1,200 00 per annum	1,200 00
1 Stenographer	1 year	900 00 per annum	900 00
1 Inspector of Gas and Electricity	1 year	1,500 00 per annum	1,500 00
7 Inspectors of Lamps and Gas	1 year	1,200 00 per annum	8,400 00
1 Inspector of Lamps and Gas	2 months 10 months	1,200 00 per annum 1,500 00 per annum	1,450 00
1 Inspector of Lamps and Gas	6 months, 24 days	1,200 00 per annum	680 00
1 Junior Clerk	8 months, 7 days	600 00 per annum	410 00
1 Stenographer	28 days	900 00 per annum	67 74
1 Painter	275 days	4 00 per diem	†1,100 00
1 Tinsmith	249 days	3 50 per diem 4 00 per diem	†886 50
1 Driver	304 days	2 50 per diem	†760 00
1 Laborer	304 days	2 25 per diem	†684 00
Total			$22,538 24

* Transferred January 1, 1907—not replaced.
† Discontinued January 1, 1908—not replaced.

SCHEDULE VII.-A.

Changes in the force of employees, and in salaries, occurred during the year as follows:

One Lamp and Gas Inspector; salary increased to $1,500, from March 1.

One Lamp and Gas Inspector; transferred to Bureau, June 7.

One Junior Clerk; appointed, April 24.

One Tinsmith; wages increased to $4 per day, from September 13.

One Tinsmith; transferred from Bureau, October 17.

One Driver; transferred from Bureau, October 31.

One Laborer; transferred from Bureau, October 31.

One Painter; transferred from Bureau, November 16.

One Stenographer; appointed, December 4.

SCHEDULE

DEPARTMENT OF WATER SUP

BUREAU OF LAMPS

BOROUGH OF

Summary of Expendi

	Outstanding Liabilities, 1906 (Estimated).				
	Streets and Parks.	Public Buildings.	Repairs.	Heat and Power. Total.	Heat and Power. Power.
Edison Electric Illuminating Company	$32,814 03	$11,381 44		$44,195 47	$1,681 87
Flatbush Gas Company (E)	536 25	837 23		1,373 48	
Flatbush Gas Company (G)		5,273 61		5,273 61	
Brooklyn Union Gas Company	150,098 00	54,834 48	$362 00	205,294 48	
Brooklyn Borough Gas Company	849 39	2,203 02	780 00	3,832 41	
Kings County Lighting Company					
New York and New Jersey Globe Gas Light Company					
Welsbach Street Lighting Company					
Total	$184,297 67	$74,629 78	$1,142 00	$259,969 45	$1,681 87

VIII.

PLY, GAS AND ELECTRICITY.

AND LIGHTING.

BROOKLYN.

tures and Liabilities.

Vouchers Chargeable to Appropriations and Fund Accounts, 1906.					
Lamps and Lighting, 1906.				Power.	
Streets and Parks.	Public Buildings.	Repairs.	Total.	Revenue Bond Fund, Heat and Power.	
$351,293 19	$67,327 23		$418,620 42	$7,535 42	$4,211 40
71,219 52	5,097 63		76,317 15		
.....					
.....		$11,351 00	11,351 00		
.....					
129,014 47	3,273 00		132,287 47		
88,782 34			98,782 34		
13,094 09			13,094 09		
$663,403 61	$75,697 86	$11,351 00	$750,452 47	$7,535 42	$4,211 40

SCHEDULE

DEPARTMENT OF WATER SUPPLY,

BUREAU OF LAMPS

BOROUGH OF

Recapitulation, 1906—

Appropriation.	
Lamps and Lighting, 1906	
Transfer authorized by Board of Estimate and Apportionment	
Vouchers issued—	
Streets and Parks	
Public Buildings	
Repairs	
Bureau Expenses	
Actual balance	
Outstanding Liabilities (estimated)—	
Streets and Parks	
Public Buildings	
Repairs	
* Salaries—Lighting and Electricity, 1906	
Vouchers Issued—	
Office, Storehouse and Inspectors	
Heat and Power—City Departments, County Buildings, Offices, etc	
Vouchers issued	
Outstanding liabilities (estimated)	
Revenue Bond Fund—Heat and Power—City Departments, County Buildings, etc	
Vouchers issued	
Total	

* Salaries—Lighting and Electricity, from which is paid the salaries in the Electrical Bureau.

IX.

GAS AND ELECTRICITY.

AND LIGHTING.

BROOKLYN.

Appropriation Accounts.

Funds Available.	Expenditures.		Estimated Balance.	
$996,000 00				
90,000 00			$1,086,000 00	
.....	$663,403 61			
.....	75,697 86			
.....	11,351 00			
.....	6,684 98			
		$757,137 45	757,137 45	
.....			$328,862 55	
.....	$184,297 67			
.....	74,529 78			
.....	1,142 00			
		259,969 45	259,969 45	
				$68,893 10
43,910 00			$43,910 00	
.....		22,538 24	22,538 24	
				†21,371 76
9,707 65			$9,707 65	
.....	$7,535 42			
.....	1,681 87			
		9,217 29	9,217 29	
				490 36
7,500 00			$7,500 00	
.....		4,211 40	4,211 40	
				3,288 60
$1,147,117 65		$1,053,073 83		$94,043 82

† Available for Electrical Bureau.

SCHEDULE I.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF QUEENS.

Cost of Lighting Public Lamps, Repairs, etc., to Same, by Companies.

Appropriation, Lamps and Lighting, 1906.

New York and Queens Electric Light and Power Company—Electric Arc Lighting.

Month.	Number of Lamps.	Price per Lamp per Year.	Outage Deductions.	*Cost of Lighting.
January	1,943	$96 00		$15,488 08
February	1,943	90 00		13,134 01
March	1,944	90 00		14,572 83
April	1,945	90 00		14,160 68
May	1,945	90 00		14,638 89
June	1,963	90 00		14,210 97
July	1,984	90 00		14,857 29
August	1,995	90 00		14,970 69
September	2,026	90 00		14,646 03
October	2,038	90 00		15,286 45
November	2,052	90 00		14,910 28
December	2,061	90 00		15,425 84
Total				†$176,302 04

* Outages deducted.

† This does not include interest charges, $407.54, paid by Comptroller out of Lamps and Lighting, 1906.

SCHEDULE I.-A.

New York and Queens Electric Light and Power Company—Electric Incandescent Lighting.

Month.	Number of Lamps.	Price per Lamp per Year.	Outage Deductions.	*Cost of Lighting.
January	160	$25 00		$303 14
February	160	25 00		303 49
March	160	25 00		303 28
April	160	25 00		301 22
May	160	25 00		303 01

Month.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	*Cost of Lighting.
June	160	25 00		303 96
July	160	25 00		301 91
August	160	25 00		301 57
September	160	25 00		303 97
October	160	25 00		301 57
November	160	25 00		300 88
December	160	25 00		299 72
Total				$3,627 72.

* Outages deducted.

SCHEDULE I.-B.

New York and Queens Electric Light and Power Company—(Assignee for the Jamaica Electric Light Company, Woodhaven)—Electric Arc Lighting.

Month.	Number of Lamps.	Price per Lamp per Year.	Outage Deduction.	*Cost per Month.
January	227	$97 50		$1,814 72
February	227	97 50		1,841 43
March	227	97 50		1,840 36
April	227	97 50		1,842 77
May	227	97 50		1,844 10
June	227	97 50		1,840 63
July	227	97 50		1,842 77
August	228	97 50		1,847 31
September	229	97 50		1,855 97
October	231	97 50		1,859 29
November	231	97 50		1,873 13
December	234	97 50		1,855 24
Total				†$22,157 72

* Outages deducted.

† This does not include interest charges, $2,880.85, paid by the Comptroller out of Lamps and Lighting, 1906.

SCHEDULE I.-c.

Queens Borough Gas and Electric Company—Electric Arc Lighting.

Month.	Number of Lamps.	Price per Lamp per Year.	Outage Deduction.	*Cost per Month.
	325-Watt.			
January	187	$90 00		$1,397 57
February	187	90 00		1,267 16
March	187	90 00		1,412 88
April	188	90 00		1,384 28
May 1 to 28	188	90 00		1,291 07
May 29 to 31				139 07
June	188	90 00		1,388 47
July	206	90 00		1,459 48
August	231	90 00		1,636 26
September	233	90 00		1,686 07
October	228	90 00		1,708 77
November	228	90 00		1,567 98
December	228	90 00		1,721 34
Total				$18,060 40

* Outages deducted.

SCHEDULE I.-D.

Queens Borough Gas and Electric Company—Electric Incandescent Lighting.

Month.	Number of Lamps.	Price per Lamp per Year.	Outage Deduction.	Cost per Month.
	78-Watt.			
January	15	$20 00		$25 00
February	15	20 00		25 00
March	15	20 00		25 00
April	15	20 00		25 00
May 1 to 28	15	20 00		22 58
May 29 to 31				2 42
June	15	20 00		25 00
July	15	20 00		25 00
August	15	20 00		25 00
September	15	20 00		25 00
October	15	20 00		25 00
November	15	20 00		25 00
December	15	20 00		25 00
Total				$300 00

Note—All electric equipment supplied and maintained by companies. All lamps burn 3,950 hours per annum.

Total electric lighting street lamps $220,447 88

SCHEDULE

New York and Queens Gas Com

	Number of Lamps.		Assumed Consumption Per Hour. Cubic Feet.
January	419		3½
		c Rental.	
February	419	214	3½
March	419	214	3½
April	419	214	3½
May	419	214	3½
June	419	214	3½
July	443	214	3½
August	450	214	3½
September	452	214	3½
October	456	214	3½
November	458	214	3½
December	458	214	3½
b Deduct difference			
Total			

a January Gas and Maintenance was certified at $29, on 50 per cent. basis on $1,011.79, and *b* The amount for January, at $23.57, would be $822.44, or a difference of $189.35, to be *c* Rental of service and standpipe discontinued in 1907.
d Gas, $10.37 per annum; 22 candle-power gas, 3,950 hours. Maintenance, $13.20.
e Gas and Maintenance.
All equipment and lamp-posts supplied and erected by company.

I.-E.

pany—Gas Lamps (Mantle).

Price Per Lamp Per Year.		Maintenance.	Gas.	Rental.	Repairs.	Total.
e $29 00			*a* $1,011 79			$1,011 79
	c Rental.					
d 23 57	$1 50	$460 39	362 05	$26 75		849 19
23 57	1 50	459 95	362 05	26 75		848 75
23 57	1 50	460 86	362 05	26 75		849 66
23 57	1 50	460 83	362 05	26 75		849 63
23 57	1 50	460 75	362 05	26 75	Painting..... $167 60	1,017 15
23 57	1 50	465 54	382 78	26 75	New Posts..... 262 00	1,137 07
23 57	1 50	489 60	388 83	26 75	Removing Posts. 86 00	991 18
23 57	1 50	495 55	390 56	26 75	Erecting Posts... 20 00	932 86
23 57	1 50	498 69	394 01	26 75	Erecting Posts... 52 00	971 45
23 57	1 50	502 63	395 74	26 75	Erecting Posts... 20 00	945 12
23 57	1 50	502 91	395 74	26 75		925 40
		$5,257 70	$5,169 70	$294 25	$607 60	$11,329 25
.....			189 35			189 35
.....			$4,980 35			$11,139 90

$505.90 paid by Department of Finance.
adjusted in final settlement.

SCHEDULE I.-F.

Newtown Gas Company—Gas Lamps (Open Flame).

1906.	Number of Lamps.	Contract Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.					
January	2,230	4	$19 05	$1,338 00	$2,202 12	‡.....	$3,540 12
February	2,231	4	19 05	1,338 60	2,203 11		3,541 71
March	2,231	4	19 05	1,338 60	2,203 11		3,541 71
April	2,231	4	19 05	1,338 60	2,203 11		3,541 71
May	2,231	4	19 05	1,338 60	2,203 11		3,541 71
June	2,231	4	19 05	1,338 60	2,203 11		3,541 71
July	2,229	4	19 05	1,337 40	2,201 14		3,538 54
August	2,225	4	19 05	*.....	2,198 45		2,198 45
September	2,153	4	19 05		2,151 10		2,151 10
†October	2,153	4	19 05		1,220 05		1,220 05
				$9,368 40	$20,988 41		$30,356 81

*All lamps maintained during August, September and October by New York and New Jersey Globe Gas Light Company. All equipment supplied by company.

†All lamps discontinued as open flame October 27, 1906.

‡No contract made for 1906. Claim may be made on Comptroller, but amount now not determined.

SCHEDULE I.-G.

Newtown Gas Company—Gas Lamps (Mantle).

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.					
January	25	3½	$24 35	$29 12	$21 60	†.....	$50 72
February	25	3½	24 35	29 13	21 61		50 74
March	25	3½	24 35	29 12	21 60		50 72
April	25	3½	24 35	29 13	21 61		50 74
May	25	3½	24 35	29 12	21 60		50 72
June	25	3½	24 35	29 13	21 61		50 74
July	24	3½	24 35	27 96	20 74		48 70
August	24	3½	24 35	*.....	20 74		20 74
September	24	3½	24 35		20 74		20 74

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.					
October	2,103	3½	24 35		784 47		784 47
November	2,088	3½	24 35		1,806 02		1,806 02
December	2,097	3½	24 35		1,802 74		1,802 74
				$202 71	$4,585 08		$4,787 79

*Lamps maintained from August 1 by New York and New Jersey Globe Gas Light Company. All equipment supplied to August 1; after that date see Schedule I-P.

†Same as noted on Scbedule I.-f.

Schedule I.-h.

Richmond Hill and Queens County Gas Light Company—Gas Lamps (Open Flame).

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.		(At $6.)	(At $8.89.)		
January	430	3	$14 89	$215 00	$318 56	†.....	$533 56
February	430	3	14 89	215 00	318 56		533 56
March	430	3	14 89	215 00	318 56		533 56
April	430	3	14 89	215 00	318 56		533 56
May	430	3	14 89	215 00	318 56		533 56
June	430	3	14 89	215 00	318 56		533 56
July	430	3	14 89	212 82	314 98		527 80
August	385	3	14 89	192 50	285 22		477 72
*September	91	3	14 89	176 45	261 44		437 89
				$1,871 77	$2,773 00		$4,644 77

*September 30, 1906, 91 open-flame lamps burning; October 1, 1906, all open-flame changed to mantle and maintenance assumed by the New York and New Jersey Globe Gas Light Company.

All equipment supplied by company to September 1, 1906; after August 1, see Schedule I-P for balance.

Above data as to number of lamps given by Richmond Hill and Queens County Gas Company.

†Same as noted on Scbedule I.-f.

SCHEDULE I.-I.

Richmond Hill and Queens County Gas Light Company—Gas Lamps (Mantle).

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total
		Cubic Feet.					
January	54	3½	$24 35	$62 91	$46 67	†.....	$109 58
February	54	3½	24 35	62 91	46 67		109 58
March	54	3½	24 35	62 91	46 67		109 58
April	54	3½	24 35	62 91	46 67		109 58
May	54	3½	24 35	*56 83	46 67		103 50
June	54	3½	24 35		46 67		46 67
July	54	3½	24 35		46 67		46 67
August	54	3½	24 35		46 67		46 67
September	348	3½	24 35		74 40		74 40
October	441	3½	24 35		381 07		381 07
November	441	3½	24 35		381 07		381 07
December	445	3½	24 35		381 96		381 96
				$308 47	$1,591 86		$1,900 33

N. B.—Above number of lamps taken from records of Richmond Hill and Queens County Gas Light Company. Up to September 1 all equipment supplied by company; after that date and after May 31 see Schedules I.-N., I.-O. and I.-P.

*Maintenance of lamps assumed by New York and New Jersey Globe Gas Light Company from May 29.

†Same as noted on Schedule I.-F.

SCHEDULE I.-J.

Woodhaven Gas Light Company—Gas Lamps (Mantle).

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.					
January	4	3½	$24 35	$4 66	$3 45	†.....	$8 11
February	4	3½	24 35	4 66	3 46		8 12
March	4	3½	24 35	4 66	3 46		8 12
April	4	3½	24 35	4 66	3 45		8 11
May	4	3½	24 35	4 66	3 46		8 12
June	4	3½	24 35	4 66	3 46		8 12
July	4	3½	24 35	4 66	3 45		8 11

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.					
August	4	3½	24 35	*.....	3 45		3 45
September	4	3½	24 35		3 45		3 45
October	5	3½	24 35		4 32		4 32
November	5	3½	24 35		4 32		4 32
December	5	3½	24 35		4 32		4 32
				$32 62	$44 05		$76 67

*Maintenance of lamps by New York and New Jersey Globe Gas Light Company from August 1, 1906. All equipment supplied by company to August 1, 1906.

†Same as noted on Schedule I.-F.

SCHEDULE I.-K.

Jamaica Gas Light Company—Gas Lamps (Open Flame).

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.					
January	15	3	$14 89	$7 50	$11 11	‡.....	$18 61
February	15	3	14 89	7 50	11 11		18 61
March	15	3	14 89	7 50	11 11		18 61
April	15	3	14 89	7 50	11 11		18 61
May	15	3	14 89	7 50	11 11		18 61
June	15	3	14 89	7 50	11 11		18 61
July	15	3	14 89	7 50	11 11		18 61
August	15	3	14 89	*.....	11 11		11 11
September	15	3	14 89		11 11		11 11
October	7	3	14 89		† 33		33
				$52 50	$100 32		$152 82

N. B.—Above data as to number of lamps given by Jamaica Gas Light Company.

*Maintenance from August 1, 1906, by New York and New Jersey Globe Gas Ligbt Company. All equipment supplied by company up to August 1, 1906; after tbis date see Schedules I.-N., I.-O. and I.-P.

†Changed to mantle October 3, 1906.

‡Same as noted on Schedule I.-F.

SCHEDULE I.-L.

Jamaica Gas Light Company—Gas Lamps (Mantle).

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.					
*January	59	3½	$24 35	$68 73	$50 98	†.....	$119 71
February	59	3½	24 35	68 73	50 98		119 71
March	59	3½	24 35	68 73	50 98		119 71
April	59	3½	24 35	68 73	50 98		119 71
May	59	3½	24 35	62 08	50 98		113 06
June	59	3½	24 35	*.....	50 98		50 98
July	59	3½	24 35		50 98		50 98
August	59	3½	24 35		50 98		50 98
September	59	3½	24 35		50 98		50 98
October	74	3½	24 35		63 55		63 55
November	75	3½	24 35		64 34		64 34
December	76	3½	24 35		65 66		65 66
				$337 00	$652 37		$989 37

N. B.—Above data as to number of lamps given by Jamaica Gas Light Company. All equipment up to May 29 supplied by company; after that date see Schedules I.-N., I.-O. and I.-P.

*Maintenance of lamps by New York and New Jersey Globe Gas Light Company from May 29, 1906.

†Same as noted on Schedule I.-P.

SCHEDULE I.-M.

Queens Borough Gas and Electric Company—Gas Lamps (Mantle).

1906.	Number of Lamps.	Assumed Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
		Cubic Feet.					
January	330	3½	$24 35	$384 45	$285 14		$669 59
February	330	3½	24 35	384 45	285 14		669 59
March	330	3½	24 35	384 45	285 14		669 59
April	330	3½	24 35	384 45	285 14		669 59
May	330	3½	24 35	347 17	285 14		632 31
June	330	3½	24 35	*.....	285 14		285 14
July	330	3½	24 35		285 14		285 14
August	330	3½	24 35		285 14		285 14
September	330	3½	24 35		285 14		285 14
October	319	3½	24 35		275 67		275 67
November	319	3½	24 35		275 67		275 67
December	319	3½	24 35		275 67		275 67
				$1,884 97	$3,393 27		$5,278 24

*Maintenance of lamps by New York and New Jersey Globe Gas Ligbt Company from May 29, 1906.

SCHEDULE I.-N.

New York and New Jersey Globe Gas Light Company—Gas Lamps (Open Flame).

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
May 29-31							
June							
July							
August	2,240		$7 20	$1,344 78			$1,344 78
September	2,168		7 20	1,314 90			1,314 90
October	2,160		7 20	*741 55			741 55
November							
December							
				$3,401 23			$3,401 23

*Maintenance of above lamps assumed on August 1, 1906, and discontinued on October 27, 1906; as then changed to mantle.

SCHEDULE I.-O.

New York and New Jersey Globe Gas Light Company—Gas Lamps (Mantle).

1906.	Number of Lamps.	Consumption Per Hour.	Price Per Lamp Per Year.	Maintenance.	Gas.	Rental.	Total.
January							
February							
March							
April							
May	451		$13 98	*$50 84			$50 84
June	451		13 98	525 42			525 42
July	451		13 98	525 42			525 42
August	464		13 98	550 44			550 44
September	760		13 98	578 19			578 19
October	2,949		13 98	2,042 66			2,042 66
November	2,935		13 98	3,420 71			3,420 71
December	2,951		13 98	3,419 59			3,419 59
				$11,113 27			$11,113 27
Total gas lighting, street lamps							$73,841 20

*Maintenance assumed May 29, 1906. Lamps all changed to mantle at above date and now under maintenance contract.

SCHEDULE

New York and New Jersey Globe Gas Light Company—Statement Showing Cost of

Month.	Newtown Gas Company.			Jamaica Gas Light Company.		
	Lamps.			Lamps.		
	No.	Type.	Amount.	No.	Type.	Amount.
May 29 to 31				67	Gas Wels.	$7 56
June				67	Gas Wels.	78 06
July				67	Gas Wels.	78 06
August	2,225	O. F. Gas.	$1,335 78	15	O. F. Gas.	9 00
	24	Gas Wels.	28 33	63	Gas Wels.	73 40
September	2,153	O. F. Gas.	1,305 90	15	O. F. Gas.	9 00
	24	Gas Wels.	27 96	63	Gas Wels.	73 40
*October	2,153	O. F. Gas.	741 28	7	O. F. Gas.	27
	2,103	Gas. Wels.	1,057 59	78	Gas Wels.	90 35
November	2,088	Gas Wels.	2,435 20	79	Gas Wels.	91 52
December	2,097	Gas Wels.	2,430 83	79	Gas Wels.	91 93
Total			$9,362 87			$602 55

* Maintenance until October 27 for 38,335 lamp days in Newtown; until October 3 for 14 lamp

Shows detail of assumption of contracts for maintenance by New York and New Jersey Globe said contracts.

All mantle gas lamps burn 3,950 hours; supplied under governor with 22 candle-power gas at 3½

I.-P.

Maintenance of Gas Lamps Assumed During 1906 in the Within Mentioned Districts.

Richmond Hill and Queens Gas Light Company.			Woodhaven Gas Light Company.			Queens Borough Gas and Electric Company.			Total.	
Lamps.			Lamps.			Lamps.				
No.	Type.	Amount.	No.	Type.	Amount.	No.	Type.	Amount.	Lamps.	Amount.
54	Gas Wels.	$6 08	..			330	Gas Wels.	$37 20	451	$50 84
54	Gas Wels.	62 91	..			330	Gas Wels.	384 45	451	525 42
54	Gas Wels.	62 91	..			330	Gas Wels.	384 45	451	525 42
..			..			...			2,240	1,344 78
54	Gas Wels.	62 91	4	Gas Wels.	$4 66	319	Gas Wels.	381 14	464	550 44
..			..			...			2,168	1,314 90
350	Gas Wels.	100 53	4	Gas Wels.	4 66	319	Gas Wels.	371 64	760	578 19
..			..			...			*2,160	741 55
445	Gas Wels.	518 42	4	Gas Wels.	4 66	319	Gas Wels.	371 64	2,949	2,042 66
445	Gas Wels.	517 96	4	Gas Wels.	4 66	319	Gas Wels.	371 37	2,935	3,420 71
451	Gas Wels.	520 23	5	Gas Wels.	4 96	319	Gas Wels.	371 64	2,951	3,419 59
		$1,851 95			$23 60			$2,673 53		$14,514 50

days in Jamaica, when all open flame lamps were discontinued.

Gas Light Company as open flame, and subsequent change of all open flame lamps to mantle under

cubic feet per hour; nominal candle-power, 60.

SCHEDULE I.-Q.

Newtown Gas Company—Naphtha Lamps (Open Flame).

Month.	Number of Lamps.	Price Per Lamp Per Year.	Outage De-duction.	Cost Per Month.
January	524	$20 88		$911 76
Total				$911 76

(Assumed by New York and New Jersey Globe Gas Light Company after January 31, 1906.)

Richmond Hill and Queens County Gas Light Company—Naphtha Lamps (Open Flame and Mantle).

Month.	Number of Lamps.	Price Per Lamp Per Year.	Outage De-duction.	Cost Per Month.
January	*48	$20 88		$83 54
	†2	27 24		4 54
Total				$88 08

* Open flame.
† Mantle.
(Assumed by New York and New Jersey Globe Gas Light Company after January 31, 1906.)

Jamaica Gas Light Company—Naphtha Lamps (Open Flame and Mantle).

Month.	Number of Lamps.	Price Per Lamp Per Year.	Outage De-duction.	Cost Per Month.
January	*178	$20 88		$309 72
	†14	27 24		30 78
Total				$340 59

* Open flame.
† Mantle.
(Assumed by New York and New Jersey Globe Gas Light Company after January 31, 1906.)

SCHEDULE I.-R.

New York and New Jersey Globe Gas Light Company, Limited—Naphtha Lamps (Open Flame).

Month.	Number of Lamps.	Price Per Lamp Per Year.	Outage De duction.	Cost Per Month.
January				
February	724	$20 88		$1,259 76
March	724	20 88		1,259 76
April	724	20 88		1,259 76
May	724	20 88		1,259 76
June	724	20 88		1,259 76
July	724	20 88		1,259 76
August	724	20 88		1,259 76
September	724	20 88		1,259 76
October	*....			*730 02
Total				$10,808 10

* All open flame naphtha lamps changed to mantle naphtha during October.

SCHEDULE I.-S.

New York and New Jersey Globe Gas Light Company, Limited (Garcia Contract*)—Naphtha Lamps (Open Flame).

Month	Number of Lamps.	Price Per Lamp Per Year.	Outage Deduction.	Cost Per Month.
January	17	$20 88		$29 58
February	17	20 88		29 58
March	17	20 88		29 58
April	17	20 88		29 58
May	17	20 88		29 58
June	17	20 88		29 58
July	17	20 88		29 58
August	17	20 88		29 58
September	17	20 88		29 58
October	17	20 88		29 58
November	17	20 88		29 58
December	17	20 88		29 58
Total				$354 96

* Contract expired December 31, 1906, and lamps changed to mantles.

SCHEDULE I.-T.

Welsbach Street Lighting Company of America—Naphtha Lamps (Mantle).

Month.	*Number of Lamps.	Price Per Lamp Per Year.	Outage Deduction.	Cost Per Month.
January	100	$27 24		$223 92
February	116	27 24		263 32
March	116	27 24		263 32
April	116	27 24		263 32
May	116	27 24		263 32
June	116	27 24		263 32
July	116	27 24		263 25
August	116	27 24		263 32
September	116	27 24		263 32
October	†738	27 24		891 74
November	737	27 24		1,652 63
December	721	27 24		1,636 23
Total				$6,511 01

* Nominal candle power, 60.
† Open flame lamps changed to mantle and added.
All equipment for mantle lamps supplied by company.
All naphtha lamps burn 3,950 hours per year.

SCHEDULE

Statement Showing Estimated Cost of Street

Companies.	Gas.			
	Maintenance.	Gas.*	Rentals.	Repairs.
New York and Queens Electric Light and Power Company				
New York and Queens Electric Light and Power Company (Woodhaven)				
Queens Borough Gas and Electric Company	$1,884 97	$3,393 27		
New York and Queens Gas Company	5,257 70	4,980 35	$294 25	$607 60
Newtown Gas Company	9,368 40	20,988 41		
Newtown Gas Company	202 71	4,585 08		
Richmond Hill and Queens County Gas Light Company	1,871 77	2,773 00		
Richmond Hill and Queens County Gas Light Company	308 47	1,591 86		
Woodhaven Gas Light Company	32 62	44 05		
Jamaica Gas Light Company	52 50	100 32		
Jamaica Gas Light Company	337 00	652 37		
New York and New Jersey Globe Gas Light Company	3,401 23			
New York and New Jersey Globe Gas Light Company	1,113 27			
New York and New Jersey Globe Gas Light Company (Garcia)				
Welsbach Street Lighting Company of America				
	$33,830 64	$39,108 71	$294 25	$607 60
	39,108 71			
	294 25			
	607 60			
Total	$73,841 20			
Grand total				

* Estimated.

I.-U.

Lighting in Borough of Queens During 1906.

Electricity.		Gas.		Naphtha.	
Arc.	Incandescent.	Open Flame.	Mantle.	Open Flame.	Mantle.
$176,302 04	$3,627 72				
22,157 72					
18,060 40	300 00		$5,278 24		
.....			11,139 90		
.....		$30,356 81		$911 76	
.....			4,787 79		
.....		4,644 77		83 54	
.....			1,900 33		$4 54
.....			76 67		
.....		152 82		309 72	
.....			989 37		30 78
.....		3,401 23		10,808 10	
.....			11,113 27		
.....				354 96	
.....					6,511 01
$216,520 16	$3,927 72	$38,555 63	$35,285 57	$12,468 08	$6,546 33
	216,520 16		38,555 63		12,468 08
.....	$220,447 88		$73,841 20		$19,014 41
.....					$313,303 49

SCHEDULE II.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF QUEENS.

Cost of Electric Lighting Public Buildings, etc., by Companies and Departments. Appropriation, Lamps and Lighting, 1906.

Department.	Companies.		Total. Departments.	Consumption, Kilowatt Hours.
	New York and Queens Electric Light and Power Company.	Queens Borough Gas and Electric Company.		
Administration Buildings	$5,479 20	$444 70	$5,923 90	50,230.0
Armories	200 00		200 00	2,000.0
Education	2,031 10	87 40	2,118 50	21,185.0
Fire		1,229 50	1,229 50	12,295.0
Police	2,282 00	544 40	2,826 40	28,264.0
Street Cleaning	22 90		22 90	229.0
Health	68 00		68 00	680.0
Libraries	2,312 30	535 50	2,847 80	28,478.0
Total companies	*$12,395 50	$2,841 50	$15,237 00	152,370.0

*This does not include interest charges, $36.08, paid by Comptroller out of Lamps and Lighting, 1906.

Rate 10 cents per kilowatt hour.

SCHEDULE

Cost of Gas Lighting in Public Buildings, by Companies and Depart
Appropriation, Lamps

Departments.	Companies.		
	Queens Borough Gas and Electric Company.	New York and Queens Gas Company.	Newtown Gas Company.
Administration Buildings		$70 04	
Armories		206 33	
Education	$105 89	314 03	$881 75
Fire	1,349 86		
Police	171 23	280 81	567 39
Street Cleaning			
Health			
Libraries	1 13	7 64	13 65
Total, companies	$1,628 11	$878 85	$1,462 79

Rate, 75 cents per 1,000 cubic feet.

II.-A.

ments, as per Meter Readings, at 75 Cents per Thousand Cubic Feet.
and Lighting, 1906.

Companies.				Total, Departments.	Consumption, Cubic Feet.
Richmond Hill and Queens County Gas Light Company.	Woodhaven Gas Light Company.	Jamaica Gas Light Company.	East River Gas Company.		
.....		$114 67	$1,282 06	$1,466 77	1,955.700
.....				206 33	275.100
$195 23	$112 28	178 57	1.372 57	3,160 32	4,213.800
.....			1,014 68	2,364 54	3,152.700
298 12		709 12	365 70	2,392 37	3,189.800
.....					
.....		4 06		4 06	5.400
16 65	2 62	15 38	149 25	206 32	275.100
$510 00	$114 90	$1,021 80	$4,184 26	$9,800 71	13,067.600

Total, electric lighting	$15,237 00
Total, gas lighting	9,800 71
	$25,037 71

SCHEDULE III.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF QUEENS.

Bureau Expenses.

Appropriation, Lamps and Lighting, 1906.

For.	Amount.	Total.	Appropriation.
Cartage, Wagon Hire and Inspectors' Disbursements	$1,161 01		
Telephone Service	373 08		
Inspections, Meter Readings, etc.	314 25		
Office Equipments	114 00		
		$1,963 24	Lamps and Lighting, 1906.
Automobile and Horse and Wagon Hire		78 00	Supplies and Contingencies, 1906.
Total		$2,041 24	

SCHEDULE IV.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF QUEENS.

Salaries.

Appropriation, Salaries, Lighting and Electricity, 1906.

Name and Position.	Salary. Month.	Salary. Year.
R. D. Godley, Assistant Engineer	$175 00	$2,100 00
Aldro F. Hitzel, Clerk	137 50	†1,512 50
*William Kalkbrenner, Clerk	62 50	†39 58
Total		$3,652 08

* Transferred from Manhattan November 12, 1906.

† A. F. Hitzel and William Kalkbrenner transferred temporarily to roll of Chief Engineer for month of December, amounting to $200, account Revenue Bond Fund to Provide Positions, etc., 1906.

SCHEDULE V.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY
BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF QUEENS.

Cost of Heat and Power to Public Buildings.

Appropriation, Heat and Power, Borough of Queens.

	New York and Queens Electric Light and Power Company.	East River Gas Company.	Total, Department.	Consumption.	
				Kilowatt-hours.	Cubic Feet.
Department of Education....	$489 18		$489 18	6,114.8	
Revenue Bond Fund, Heat and Power, Borough of Queens.					
Department of Education....	160 15	$78 67	238 82	2,001.9	104,900
Total.....	$649 33	$78 67	$728 00	8,116.7	104,900

Rate, 8 cents per kilowatt-hour.
Rate, 75 cents per thousand cubic feet.

SCHEDULE

DEPARTMENT OF WATER SUPPLY,

BUREAU OF LAMPS

BOROUGH

Summary of Expenditures

Company	Vouchers Chargeable to Appropriations Lamps and Lighting, 1906		
	Streets	Public Buildings	Total
New York and Queens Electric Light and Power Company	*$202.087 48	*$12,395 50	$214,482 98
Queens Borough Gas and Electric Company (electric)	18,360 40	2,841 50	21,201 90
Queens Borough Gas and Electric Company (gas)		1,047 09	1,047 09
New York and Queens Gas Company (gas and maintenance)	†822 44		6,981 99
New York and Queens Gas Company (maintenance)	6,159 55		
New York and New Jersey Globe Gas Light Company (gas)	13,178 72		13,178 72
New York and New Jersey Globe Gas Light Company (naphtha)	4,780 74		4,780 74
Welsbach Street Lighting Company of America	6,511 01		6,511 01
Newtown Gas Company			
Richmond Hill and Queens County Gas Light Company			
Woodhaven Gas Light Company			
Jamaica Gas Light Company			
East River Gas Company			
Total	$251,900 34	$16,284 09	$268,184 43

* This does not include interest charges paid by Comptroller out of Lamps and Lighting and

† Vouchered for $1,011.79; to be adjusted in final settlement; difference, $189.35.

VI.

GAS AND ELECTRICITY.

AND LIGHTING.

OF QUEENS.

and Liabilities.

and Fund Accounts, 1906.		Outstanding Liabilities, 1906, Estimated.			
Power.		Revenue Bond Fund, Heat and Power, City Departments.	Streets.	Public Buildings.	Total.
Appropriation.	Revenue Bond Fund.				
*$489 18	$160 15				
.....					
.....			$5,278 24	$581 02	$5,859 26
.....			4,157 91	878 85	5,036 76
.....			1,335 78	‡.....	1,335 78
.....			6,382 32	‡.....	6,382 32
.....					
.....			36,056 36	1,462 79	37,519 15
.....			6,633 18	510 00	7,143 18
.....			76 67	114 90	191 57
.....			1,482 69	1,021 80	2,504 49
.....		$78 67		4,184 26	4,184 26
$489 18	$160 15	$78 67	$61,403 15	$8,753 62	$70,156 77

Heat and Power, City Departments, etc., 1906.

‡ Newtown.

SCHEDULE VII.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.
BUREAU OF LAMPS AND LIGHTING.
BOROUGH OF QUEENS.
Recapitulation, 1906 Appropriation Accounts.

Appropriations.	Funds Available.	Expenditures.		Estimated Balance.	
Lamps and Lighting, 1906.	$334,000 00				
Lamps and Lighting, Revenue Bond Fund, 1906.	20,000 00				
				$354,000 00	
Vouchers Issued—					
Street lighting.....		$251,900 34			
Public buildings.....		16,284 09			
Bureau expenses.....		1,963 24			
			$270,147 67	270,147 67	
Actual balance..				$83,852 33	
Outstanding Liabilities (Estimated)—					
Street lighting..		$61,403 15			
Public buildings.....		8,753 62			
			70,156 77	70,156 77	
					*$13,695 56
Salaries, Lighting and Electricity, 1906.....	$13,512 00			$13,512 00	
Vouchers issued.....			3,652 08	3,652 08	
					†9,859 92
Heat and Power, City Departments, County Buildings, etc.....	500 00			$500 00	
Vouchers issued.....			489 15	489 15	
					*10 85
Revenue Bond Fund, Heat and Power, etc.....	1,250 00			$1,250 00	
Vouchers issued.....		$160 15			
Outstanding liabilities (estimated)		78 67			
			238 82	238 82	
					1,011 18
Total.....	$369,262 00		$344,684 49		$24,577 51

* These balances do not include interest charges—$2,916.75 and $3.13—paid out of Lamps and Lighting, 1906, and Heat and Power, City Departments, etc., 1906, respectively, by Comptroller in settlement January 15, 1907.

† This balance applies to both Bureau of Lamps and Lighting and Electrical Bureau, the expenditures of which latter Bureau are not known to the former.

SCHEDULE I.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF RICHMOND.

Cost of Lighting Public Lamps, Repairs, etc., by Companies.

Appropriation, Lamps and Lighting, 1906.

Richmond Light and Railroad Company—Electric Arc Lamps (325 Watt Lamps).

Month.	Number of Lamps.	Price Per Lamp, Per Year.	Outage Deductions.	Cost of Lighting.
January	592	*$100 00	$28 83	$4,999 62
February	592	90 00	10 54	4,077 10
March	592	90 00	8 89	4,516 71
April	593	90 00	19 47	4,361 62
May	593	90 00	14 35	4,518 90
June	594	90 00	246 21	4,142 77
July	594	90 00	365 22	4,175 67
August	618	90 00	1,860 09	2,774 76
September	620	90 00	324 42	4,256 43
October	623	90 00	215 70	4,52?- 27
November	623	90 00	181 50	4,427 45
December	632	90 00	74 60	4,706 73
Total			$3,349 82	$51,495 03

* No contract in January. Price estimated.
Alternating current lamps.

SCHEDULE I.—a.

Richmond Light and Railroad Company—Electric Incandescent Lamps (90 to 100 Watt Lamps).

Month.	Number of Lamps.	Price Per Lamp, Per Year.	Outage Deductions.	Cost of Lighting.
January	3,606	$25 00	$51 33	$7,601 67
February	3,606	25 00	9 67	6,905 63
March	3,606	25 00	13 50	7,642 72
April	3,606	25 00	31 28	7,377 97
May	3,606	25 00	197 39	7,458 83
June	3,606	25 00	933 56	6,475 69
July	3,606	25 00	1,110 29	6,545 93

Month.	Number of Lamps.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.
August	3,606	25 00	5,019 28	2,636 94
September	3,606	25 00	1,431 59	5,979 71
October	3,609	25 00	1,567 35	6,093 80
November	3,722	25 00	1,102 87	6,507 47
December	3,933	25 00	204 26	7,726 68
Total			$11,672 37	$78,953 04
Total Electric Lighting, Street Lamps, 1906				$130,448 07

Company furnishes entire equipment and maintains same.
All lamps burn 3,950 hours.
The excessive outages in arc and incandescent lighting due to general breakdown of plant.

SCHEDULE II.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF RICHMOND.

Cost of Lighting Public Lamps, Repairs, etc., by Companies.
Appropriation, Lamps and Lighting, 1906.
Mary A. Van Pelt—Oil Lamps (12 C. P.).

Month.	Number of Lamps, Open Flame, Kerosene.	Price Per Lamp Per Year.	Outage Deductions.	Cost of Lighting.
January	100	$12 00		$100 00
February	100	12 00		100 00
March	100	12 00		100 00
April	100	12 00		100 00
May	100	12 00		100 00
June	100	12 00		100 00
July	100	12 00		100 00
August	100	12 00		100 00
September	100	12 00		100 00
October	100	12 00		100 00
November	100	12 00		100 00
December	100	12 00		100 00
Total				$1,200 00

Discontinued for good, January 1, 1907.

SCHEDULE III.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF RICHMOND.

Cost of Lighting Public Buildings, etc., by Companies and Departments.

Appropriation, Lamps and Lighting, 1906.

Departments.	*Richmond Light and Railroad Company.	†New York and Richmond Gas Company.	Total, Departments.
Public Buildings	$3,525 96		$3,525 96
Education	3,121 65	$398 02	3,519 67
Fire	833 74	1,045 59	1,879 33
Police	479 92	466 93	946 85
Street Cleaning	416 76		416 76
Farm Colony	791 60		791 60
Water Supply, Gas and Electricity		10 51	10 51
Docks and Ferries		1 35	1 35
Richmond County Court House and Jail	‡75 54		75 54
	$9,245 17	$1,922 40	$11,167 57

* Ten cents per kilowatt-hour. † Seventy-five cents per 1,000 cubic feet. ‡ Five cents per kilowatt-hour.

SCHEDULE IV.

Bureau Expenses.

Appropriation, "Lamps and Lighting, 1906."

	Amount.
Furniture and fixtures	$139 05
Carfare	327 00
Telephone	12 00
Maintenance of gas regulators	20 40
Rent of photometric stations	200 00
Supplies	36 16
Repairing safe	28 50
Horse hire, and automobile	720 00
Miscellaneous	75 00
Total	$1,558 11

SCHEDULE V.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF RICHMOND.

Cost of Furnishing Power to Public Buildings, etc., by Companies and Departments.
Appropriation, Revenue Bond Fund, Heat and Power.

Departments.	Richmond Light and Railroad Company, 5 Cents Per Horse Power Hour.
Fire	$37 32
Richmond County Court House	129 29
Richmond County Jail	20 39
Borough Hall	14 14
Crematory	57
	$201 71

SCHEDULE VI.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF RICHMOND.

Salaries.

Appropriation, Salaries, Lighting and Electricity.

Name and Position.	Rate Per Annum.	Amount.
John A. Driscoll, Clerk	$1,200 00	$1,200 00
George Sheridan, Chief Inspector of Electrical Conductors	1,500 00	1,500 00
Hammond Van Vechten, Inspector of Exterior Wiring	1,000 00	*999 96
Total		$3,699 96

* Paid at the rate of $83.33 per month.

SCHEDULE VII.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

BUREAU OF LAMPS AND LIGHTING.

BOROUGH OF RICHMOND.

Recapitulation, 1906 Appropriation Accounts.

Appropriation.	Funds Available.		Expenditure.	Estimated Balance.	
Lamps and Lighting, 1906.	$157,900 00				
Less transfer to Borough of Queens	20,000 00				
		$137,900 00			
Revenue Bond Fund, Lamps and Lighting		8,000 00			
				$145,900 00	
Vouchers Issued—					
Streets and Parks			$129,627 78		
Public buildings			9,245 17		
Bureau expenses			1,558 11		
				140,431 06	
Actual balance				$5,468 94	
Outstanding Liabilities (estimated)—					
Gas			$1,922 40		
January, 1906, Richmond Lighting and Railroad Company, balance			2,020 29		
				3,942 69	
					*$1,526 25
Salaries, Lighting and Electricity		$6,469 00		$6,469 00	
Vouchers Issued—					
Salaries of Clerks and Inspectors			$3,699 96	3,699 96	
					2,769 04
Revenue Bond Fund		500 00		$500 00	
Vouchers Issued—					
Power to public buildings			201 71	201 71	
					298 29
Total		$152,869 00	$148,275 42		$4,593 58

* Appropriation Lamps and Lighting totally expended; balance, $1,526.25 to the credit of Revenue Bond Fund, Lamps and Lighting.

December 31, 1906.

Mr. CHARLES F. LACOMBE, Chief Engineer of Light and Power, Nos. 13 to 21 Park Row, New York:

Dear Sir—I herewith submit a report of changes in public lighting, etc., in the Boroughs of Manhattan and The Bronx, during the year 1906, with a few remarks regarding work done in the Boroughs of Brooklyn and Queens, by employees of this Bureau, under my direction.

All the open flame gas lamps except two in ornamental lanterns on the building of the Society for the Prevention of Cruelty to Animals, in the Borough of Brooklyn, were changed to Welsbach mantle lamps, the actual work of changing the equipment being done between August 20 and October 18, during one week of which time the work was stopped, owing to a delayed shipment of glass.

On September 26, one of the Brooklyn gangs was transferred to the Borough of Queens, and beginning at Richmond Hill, proceeded to change the open flame gas and naphtha lamps to mantle lamps. The second gang was also transferred to Queens after completing the work in Brooklyn, and on October 30 practically all the gas street lamps in the Greater City, excepting those in the Thirtieth Ward of Brooklyn, which are maintained by the Kings County Lighting Company under an old contract, and practically all the naphtha lamps in the Boroughs of Manhattan, Brooklyn and Queens were of the Welsbach mantle type; the open flame naphtha lamps in Manhattan having been changed to mantle lamps in August. During November, the open flame naphtha lamps in the Borough of The Bronx were also changed to mantle lamps. The few remaining open flame gas lamps which are principally fire alarm and police signal lamps in Manhattan and The Bronx, will be changed to mantle lamps as far as possible in the early part of next year. This work was delayed on account of the general change in Brooklyn and Queens. It will be some time before the fire alarm lamps in The Bronx can be equipped with mantle burners, as several styles of lettering will be required on the glass, and it will take several months to make the necessary provisions and secure the glass.

We are also at work compiling new maps of the Boroughs of Brooklyn and Queens showing the location, kind and style of each lamp.

Next to the equipment of gas and naphtha lamps with mantle burners, the most important change in the lighting system was the installation of electric arc lamps in place of mantle gas lamps, on all the streets in the section lying between East Broadway and East River, from Dover street to Grand street. Aside from increasing the street lighting in the most densely populated section of the City, this change was desirable and necessary owing to the fact that the ground in this section is very low and quite distant from the gas holder supplying it. The supply of gas was quite unsatisfactory, and it was hoped that the discontinuance of the gas street lamps would offer some relief.

It is also proposed to continue to replace the existing mantle gas lamps with electric arc lamps through the section lying east of the Bowery as far north as Houston street. This will probably be done next year.

A large number of lamps were relocated on various streets, greatly improving the lighting conditions at little or no additional cost, and a large number of old style partly wooden electric light poles have been replaced with the "bishop's crook" iron posts, which present a much handsomer appearance. The lighting on Blackwells Island was improved by the installation of nineteen new mantle naphtha lamps, and plans were completed in the early part of the year for lighting the roads on Randalls Island, but the installation has been delayed on account of the wiring of the buildings, etc. Plans were also completed for the lighting of the Riverside Drive extension and Park, Seventh avenue (boulevard), from One Hundred and Tenth street to Harlem River, and Marginal street, from Bloomfield street to Twenty-third street (account Dock Department, Chelsea Improvement), so that we are ready to go ahead as soon as the conditions will permit the installation of the lamps.

Twin arc lamps (450 watts per lamp) were installed on two poles in the public squares formed by the junction of Broadway and Fifth avenue, at Twenty-third to Twenty-fifth street, greatly improving the lighting at this point. Improvement was also made in the lighting of Bryant Park and around Union Square Park, special fixtures being erected on the terminal posts of the esplanade railing on the north side of Union Square Park. The arc lamps in several parks will be relocated to secure better results and placed on underground service during the coming year.

The Old Ship Canal bridge has been moved down the Harlem River, and will connect the Borough of Manhattan at Two Hundred and Seventh street with the Borough of The Bronx in the vicinity of One Hundred and Eighty-fourth street. This bridge will probably be opened for traffic in the late summer, and is to be lighted by electric arc lamps, current to draw span being supplied from each side of the river

The draw span of the present bridge connecting Madison avenue (Manhattan) with One Hundred and Thirty-eighth street (The Bronx) is to be moved south to a point between One Hundred and Thirty-sixth and One Hundred and Thirty-seventh streets, and will be lighted with its present equipment of open flame gas lamps. The approaches are to be provided with electric arc lamps, some of which are already in place. This bridge is only to do temporary service during the construction of a new bridge on the site of the present one.

The new double deck bridge over the Ship Canal at Broadway is to be lighted at first by two systems, public arc lamps on the north approach, and incandescent clusters on the draw and south approach, the latter to be provided and maintained by the Interborough Street Railroad Company, until we are able to continue our arc lighting system to this point and replace the incandescent clusters with electric arc lamps.

For some time past we have been endeavoring to perfect an adjustable mast-arm pole for use on boulevards and avenues lined with trees, where satisfactory results

cannot be obtained with the styles of posts now in use. We have finally secured a design which it is believed will give satisfaction, and we hope to be able to install some of the new posts next year. Should the proposed post come up to expectations it will work a great improvement in the system of lighting, besides adding to the appearance of the streets. The credit of this is due largely to the cooperation of the New York Edison Company.

We were only able to install a comparatively few gas lamps in The Bronx during the year, owing to the fact that as we were without contracts for supply of gas, the gas companies did not extend their mains through streets where we desired to place gas lamps. We will undoubtedly have the same trouble during the year 1907, and may have to install electric and naphtha lamps where gas lamps would be more desirable, for such lamps would aid persons living on these streets to secure a gas supply to their houses, particularly in the more sparsely settled districts.

The total number of arc lamps on a 450-watt lamp basis maintained by the New York Edison Company in Manhattan and The Bronx, including those assigned by the United Electric Light and Power Company and the Westchester Lighting Company, on December 31, was 5,135, but as the 5,000 mark was not passed until after the 1st of December, we do not begin to get the benefit of the reduced rate of $95 per lamp, for lamps in excess of 5,000 until January 1, 1907, as per contract.

On February 1, the date of the beginning of the contract, thirty-eight lamps were transferred from the New York Edison Company district to the United district, and are shown in Table "A," as lamps discontinued by the New York Edison Company, and relighted by the United Electric Light and Power Company.

The New York Edison Company have also billed eight (8) electric arc lamps in the district of the Westchester Lighting Company, from February 1, which were previously maintained as free lamps, in acordance with the conditions of their franchise; these lamps have been deducted from all figures given and will be deducted until the question of the legality of the rate is settled.

The cost of the supply of gas to public gas lamps on street service is not given in the tables, but at the rate of 75 cents per thousand cubic feet, as specified in "Laws of 1905," it can be figured at $8.89 per lamp per year, for open flame gas lamps, and $10.37 per lamp per year, for mantle gas lamps.

The total number of mantle gas lamps maintained by the Consolidated Gas Company in the Borough of Manhattan, includes two (2) lamps at the Casino, Central Park, which are on meter service. It is also proposed to install mantle burners in lamps in front of various police stations which are on meter service during the next year.

The effect of the appointment of additional Inspectors in October is noticeable in the improved condition of the lamps and lamp-posts, more than in the increased number of outages reported, owing to the Inspectors' daily reports on the condition of

the lamps. The increased number of Inspectors permitted a reduction in the size of the districts, so that each individual lamp is now inspected at least once a week, besides which, each Inspector makes a general inspection of his district nightly to see that all lamps are burning properly, and reports any lamps that he finds defective or not lighted. The majority of defective lamps are usually found in certain sections of each district, and the lighting company is enabled by the reports to use additional care in the maintenance in such sections and to discover and guard against the cause of the trouble.

Tables "A" to "J" herewith give changes in lighting, repairs to gas lamps, new streets lighted, mains installed, etc., during the year.

Respectfully submitted,

WM. G. QUIRK,
General Inspector of Street Lighting.

TABLE A.

Showing Number of New Electric, Gas and Naphtha Lamps Lighted, Lamps Relighted and Lamps Discontinued During the Year 1906, Total Number of Lamps Burning December 31, 1906, and Average Number of Lamps Burning Throughout the Year 1906.

BOROUGH OF MANHATTAN.

Company and Kind of Lamp.	Number of Lamps January 1, 1906.	New Lamps Lighted.	Lamps Relighted.	Lamps Discontinued.	Number of Lamps December 31, 1906.	Average Number of Lamps Burning During Year.
ELECTRIC.						
New York Edison Company—						
Arc, 450 W.....	2,967	319	...	47	3,239	3,020
Arc, 500 W. pairs...	206			1	205	206
Arc, 325 W.....	24				24	24
Incandescent, 78 W.	80	8			88	85
United Electric—						
*Arc, 450 W.....	111	75			186	172
Incandescent, 78 W.	4				4	4
Total, Arc.....	3,308	394		48	3,654	3,422
Total, Incandescent	84	8			92	89
Total, Electric	3,392	402		48	3,746	3,511
GAS.						
Consolidated Gas Company—						
D. Welsbach.....	4			4		1
S. Welsbach.....	16,743	126	723	1,540	16,052	16,490
Ordinary	212		14	103	123	183
New Amsterdam Gas Company—						
Ordinary	32		2	26	8	28
Standard Gas Company—						
Ordinary	12		1	6	7	11
Total, Welsbach..	16,747	126	723	1,544	16,052	16,491
Total, Ordinary...	256		17	135	138	222
Total, Gas....	17,003	126	740	1,679	16,190	16,713

Company and Kind of Lamp.	Number of Lamps January 1, 1906.	New Lamps Lighted.	Lamps Re-lighted.	Lamps Discontinued.	Number of Lamps December 31, 1906.	Average Number of Lamps Burning During Year.
NAPHTHA.						
Welsbach Street Lighting Company of America—						
Welsbach	968	162	1	15	1,116,	1,025
New York and New Jersey Globe Gas Light Company—						
Ordinary	107			107		62
Total, Naphtha	1,075	162	1	122	1,116	1,087
Grand total, Manhattan.	21,470	690	741	1,849	21,052	21,311

*Arc lamps assigned to New York Edison Company February 1, 1906.

TABLE B.

Showing Number of New Electric, Gas and Naphtha Lamps Lighted, Lamps Relighted and Lamps Discontinued During the Year 1906, Total Number of Lamps Burning December 31, 1906, and Average Number of Lamps Burning Throughout the Year 1906.

BOROUGH OF THE BRONX.

Company and Kind of Lamp.	Number of Lamps January 1, 1906.	New Lamps Lighted.	Lamps Re-lighted.	Lamps Discontinued.	Number of Lamps December 31, 1906.	Average Number of Lamps Burning During Year.
ELECTRIC.						
New York Edison Company—						
Arc, 450 W.....	1,134	135		13	1,256	1,174
Incandescent, 78 W..	370	2			372	370
Westchester Lighting Company—						
*Arc, 450 W.....	237	12			249	243
Incandescent, 78 W..	16				16	16
Bronx Gas and Electric Company—						
Arc, 400 W.....	671	10			681	675
Total, Arc.....	2,042	157		13	2,186	2,092
Total, Incandescent	386	2			388	386
Total, Electric	2,428	159		13	2,574	2,478

Company and Kind of Lamp.	Number of Lamps January 1, 1906.	New Lamps Lighted.	Lamps Re-lighted.	Lamps Discon-tinued.	Number of Lamps December 31, 1906.	Average Number of Lamps Burn-ing During Year.
GAS.						
Consolidated Gas Company—						
Welsbach	6,013	190	124	406	5,921	5,935
Central Union Gas Company—						
†Ordinary	38				38	38
Northern Union Gas Company—						
†Ordinary	54		1	2	53	54
Westchester Lighting Company—						
†Ordinary	3				3	3
Total, Welsbach...	6,013	190	124	406	5,921	5,935
Total, Ordinary....	95		1	2	94	95
Total, Gas....	6,108	190	125	408	6,015	6,030
NAPHTHA.						
Welsbach Street Lighting Company of America—						
Welsbach	474	1,361	13	22	1,826	837
New York and New Jersey Globe Gas Light Company—						
Ordinary	1,238			1,238		892
Total, Naphtha	1,712	1,361	13	1,260	1,826	1,729
Grand total, The Bronx..	10,248	1,710	138	1,681	10,415	10,237
Manhattan and The Bronx	31,718	2,400	879	3,530	31,467	31,548

*Arc lamps assigned to New York Edison Company February 1, 1906.
†These lamps maintained by Consolidated Gas Company from February 1, 1906.

TABLE C.

Resume.

BOROUGHS OF MANHATTAN AND THE BRONX.

Kind of Lamp.	Number of Lamps January 1, 1906.	New Lamps Lighted.	Lamps Re-lighted.	Lamps Discontinued.	Number of Lamps December 31, 1906.	Average Number of Lamps Burning During Year.
Electric—						
Arc	5,350	551		61	5,840	5,514
Incandescent	470	10			480	475
Total, Electric	5,820	561		61	6,320	5,989
Gas—						
Double Welsbach....	4			4		1
Single Welsbach....	22,756	316	847	1,946	21,973	22,425
Ordinary	351		18	137	232	317
Total, Gas....	23,111	316	865	2,087	22,205	22,743
Naphtha—						
Welsbach	1,442	1,523	14	37	2,942	1,862
Ordinary	1,345			1,345		954
Total, Naphtha	2,787	1,523	14	1,382	2,942	2,816
Grand total	31,718	2,400	879	3,530	31,467	31,548

TABLE

Showing Number of Each Kind of Repairs Made to Gas Lamp-posts

Company.	New Lamp-post Fitted Up.	Lamp-post Removed.	Lamp-post Reset.
MANHATTAN.			
Consolidated Gas Company	125	548	263
New Amsterdam Gas Company			
Standard Gas Light Company			
Total, Manhattan	125	548	263
THE BRONX.			
Central Union Gas Company	105	160	52
Northern Union Gas Company	86	287	140
Westchester Lighting Company		4	8
Total, The Bronx	191	451	200
Grand total, Manhattan and The Bronx	316	999	463

D.

by Each Company in Manhattan and The Bronx During the Year 1906.

Lamp-post Straightened.	Column Refitted.	Column Releaded.	Column Recaulked.	Service Pipe Refitted.	Stand Pipe Refitted.	Total.	Number of Lamp-posts Painted.
997	73	372	254	177	183	2,992	15,862
....							
....							
997	73	372	254	177	183	2,992	15,862
9		3		19	18	366	2,589
8		9	1	52	62	645	3,398
....						12	
17		12	1	71	80	1,023	5,987
1,014	73	384	255	248	263	4,015	21,849

TABLE E.

Showing the Number and Cost of Repairs to Gas Lamp-posts in Manhattan and The Bronx, and the Average Number and Cost of Repairs Per Lamp During the Year 1906.

Borough.	Average Number of Lamps.	Number of Repairs.	Cost of Repairs.	Average Number of Repairs Per Lamp.	Average Cost of Repairs Per Lamp.	Cost of Painting Per Lamp.
Manhattan	16,713	2,992	$9,368 00	.17902	.56052	$0 20
The Bronx	6,030	1,023	5,255 00	.16965	.87147	25
Total	22,743	4,015	$14,623 00	.17653	.64296	

TABLE F.

Showing Locations at Which New Lamps Were Installed During the Year 1906.

BOROUGH OF MANHATTAN.

New York Edison Company (Electric Arc Lamps).

Location.	Number of Lamps.
Allen street, from Division street to Houston street	11
Bowery, northwest corner of Houston street	1
Cherry street, from Catharine street to East street	28
Cliff street, northwest corner of Ferry street	1
Delancey street, from Attorney street to East street	16
Division street, from Bowery to Allen street	5
Duane street, northwest corner of William street	1
Forsyth street, northwest corner of Bayard street	1
Front street, between Dover street and Roosevelt street (1); southeast corner Old Slip (1)	2
Front street, from Gouverneur Slip to Jackson street	3
Henry street, from Oliver street to Grand street	18
Hamilton street, from Catharine street to Market street	3
Jacob street, northeast corner of Ferry street	1
James street, from Madison street to South street	6
Madison street, from Catharine street to Grand street	20
Marginal street, northeast corner of Little West Twelfth street	1

Location.	Number of Lamps.
Monroe street, from Catharine street to Corlears street	22
Market street, between Hamilton street and Cherry street	1
New Chambers street, southeast corner of Batavia street	1
Oliver street, from Oak street to Cherry street	2
Pearl street, between Ferry street and Dover street (1); northwest corner New Chambers street (1); southeast corner William street (1)	3
Pike street, between Monroe street and Cherry street	1
Park avenue, northeast corners of Fifty-first street, Fifty-second street, Fifty-third street, Fifty-fourth street, Fifty-fifth street and Fifty-sixth street	6
Pleasant avenue, southeast corner of One Hundred and Tenth street	1
Rose street, northwest corner of Frankfort street	1
South street, from Catharine street to Corlears street	24
Stone street, southwest corner of Coenties alley	1
Trinity place, northwest corner of Cedar street	1
Unnamed street, from Pitt street to East street	10
University place, southeast corner of Fourteenth street	1
Water street, from Beekman street to East street	31
Washington street, southeast corner of Barrow street (1); northeast corner of Little West Twelfth street (1)	2
West street, from Bank street to Horatio street	6
Third avenue, between Ninety-eighth street and Ninety-ninth street	1
Fourth avenue and Cooper square	1
Seventh avenue, southwest corner of One Hundred and Tenth street	1
Eighth avenue, southwest corner of Thirty-fourth street (1); northeast corner of Fifty-seventh street (1)	2
Broadway, Twenty-third, Twenty-fourth and Forty-second streets (5), and Forty-eighth to Fifty-ninth street (8)	13
West Fourth street, between Barrow street and Grove street	1
Seventeenth street, between Broadway and Fourth avenue	1
Twenty-fourth street pier (2); between Lexington avenue and Third avenue (1)	3
Fifty-first street, from Beekman place to East River	2
Fifty-second street, from First avenue to East River	4
Seventieth street, from Avenue A to East River	3
Seventy-first street, from Columbus avenue to Central Park West	3
Eighty-sixth street, between First avenue and Second avenue	1

Location.	Number of Lamps.
One Hundred and Sixteenth street, from Morningside avenue to East River	23
One Hundred and Thirty-fifth street, from St. Nicholas avenue to Park avenue	13
Parks, Etc.	
Battery Park (bath)	2
Bryant Park	3
St. Gabriels Park	3
Union Square Park	3
Market street (bath)	2
Gansevoort Market	2
	319

Incandescent Electric Lamps.

Location.	Number of Lamps.
City Hall Park	8

Electric Arc Lamps Installed.

United Electric Light and Power Company.

Location.	Number of Lamps.
Amsterdam avenue, northeast and southwest corners of One Hundred and Forty-fifth street (2); southeast corner of One Hundred and Seventieth street (1)	3
Broadway, from One Hundred and Fifty-seventh street to One Hundred and Seventieth street	14
One Hundred and Thirty-fifth street, between Broadway and Amsterdam avenue	4

Location.	Number of Lamps.
One Hundred and Thirty-sixth street, between Riverside drive and Amsterdam avenue	5
One Hundred and Thirty-seventh street, between Riverside drive and Broadway	1
One Hundred and Forty-fifth street, between Eighth and Lenox avenue	8
One Hundred and Fifty-sixth street, between Broadway and Riverside drive	2
	37

BOROUGH OF THE BRONX.

New York Edison Company (Electric Arc Lamps).

Location.	Number of Lamps.
Bathgate avenue, northeast corner of Wendover avenue	1
Boston road, between Wilkins avenue and Charlotte street	1
Burnet place, northwest corner Tiffany street	1
Depot Place South and Depot Place North	2
Edgewater road, south of Jennings street	1
Fox street, southeast corner of Longwood avenue	1
Fulton avenue, southwest corner of Wendover avenue	1
Hewitt place, southeast corner Longwood avenue (1), between Longwood and Westchester avenues (1)	2
Jackson avenue, junction of Boston road	1
Jerome avenue, southeast corner of One Hundred and Sixty-ninth street (1), Kingsbridge road to Two Hundred and Thirty-third street (41)	42
Madison Avenue Bridge, temporary approach	5
Mott avenue, between One Hundred and Thirty-eighth street and approach to Madison Avenue Bridge	1
Muscoota street (Farmers road), Broadway to Bailey avenue	4
Ogden avenue, from Aqueduct avenue to One Hundred and Seventieth street	2
Spofford avenue, from Casanova street to Hunts Point road	3

Location.	Number of Lamps.
Webster avenue, opposite One Hundred and Ninety-ninth street (1); One Hundred and Seventy-ninth street to Pelham avenue (17); Two Hundred and First street to Gun Hill road (15)	33
Westchester avenue, junction of West Farms road (1); southeast corner of Faile street (1); southeast corner of Edgewater road (1)	3
One Hundred and Thirty-eighth street from Brown place to St. Anns avenue	2
One Hundred and Forty-seventh street, between Willis and Brook avenues	1
Third avenue, west side, north of One Hundred and Thirty-eighth street	1
	108
Parks.	
Van Cortlandt Park	9
Crotona Park	5
	122
Incandescent Electric Lamps.	
Two Hundred and Thirty-ninth street, west of Blackstone avenue	2

BOROUGH OF MANHATTAN.

Consolidated Gas Company (Welsbach Gas Lamps).

Location.	Number of Lamps.
Trinity place, west side, 1 south of Rector street	1
Twenty-ninth street, north and south sides, 1 and 2 east of Second avenue	4
Sixty-ninth street, south side, 1 east of Amsterdam avenue	1
One Hundred and Seventh street, south side, 4 east of Amsterdam avenue	1
One Hundred and Twenty-seventh street, northwest and southeast corners of Convent avenue	2
One Hundred and Thirty-fourth street, north side, 1, 2, 3 and south side, 1, 2, 3, 4 east of Broadway	7
One Hundred and Fortieth street, north side, 1 east of St. Nicholas avenue	1
One Hundred and Forty-third street, north side, 1 east of Lenox avenue	1

Location.	Number of Lamps.
One Hundred and Forty-fourth street, south side, 1 and 2 east of Lenox avenue	2
One Hundred and Fifty-second street, north and south sides, 1 east of Eighth avenue	2
One Hundred and Seventieth street, northeast corner of Haven; north side, 1 east of Haven; south side, 1 east of Haven	3
One Hundred and Seventy-first street, south side, 1 east of Broadway; south side, 1 and 2 east of Audubon avenue; north side, 1 east of Audubon avenue	4
One Hundred and Seventy-sixth street, south side, 1 and 2 east of Audubon avenue	2
One Hundred and Eighty-second street, north and south sides, 1 east of Wadsworth avenue	2
One Hundred and Eighty-second street, south side, 1 east of Broadway	1
One Hundred and Eighty-fourth street, south side, 1 east of St. Nicholas avenue; north side, 1 west of Audubon avenue	2
One Hundred and Eighty-fourth street, south side, 1 east of Audubon avenue; north side, 1 and 2 east of Audubon avenue	3
One Hundred and Eighty-fourth street, north and south sides, 1 east of Broadway	2
Park avenue, north and south sides of One Hundred and Second, One Hundred and Third, One Hundred and Fourth, One Hundred and Fifth, One Hundred and Sixth, One Hundred and Seventh, One Hundred and Eighth and One Hundred and Ninth streets	16
Riverside drive, east side, 1 north of Ninety-third street	1
Wadsworth avenue, from One Hundred and Seventy-third street to 1 north of One Hundred and Eighty-eighth street	25
Audubon avenue, from One Hundred and Seventy-ninth street to 1 north of One Hundred and Eighty-ninth street	15
Nagle avenue, west side, 1 south of Dyckman street, east side, junction of St. Nicholas avenue	2
Hawthorne street, northeast corner of Seaman avenue; south side, 1 east of Seaman avenue	2
Churches, Schools, Etc.	
Church, Second street, north side, east of Avenue C	1
Church, Thirteenth and Fourteenth streets, east side of First avenue	3

Location.	Number of Lamps.
Rabbi School, Henry street, north side, east of Jefferson street	1
School, Washington street, west side, north of Morton street	1
Church, Second avenue, west side, north of Twenty-first street	2
Church, Thirty-sixth street, south side, east of Tenth avenue	2
Church, Thirty-seventh street, south side, west of Broadway	4
Church, One Hundred and Fifteenth street, north side, east of St. Nicholas avenue	2
Church, Mount Morris Park West, west side, south of One Hundred and Twenty-second street	2
Church, One Hundred and Fifty-seventh street, south side, west of Amsterdam avenue	2
Church, West End avenue, west side, north of One Hundred and Sixth street	1
Synagogue, Lexington avenue, east side, north of Ninety-fourth street	2
Hospital, Park avenue, east side, north of Seventy-sixth street	1
Total	126

BOROUGH OF THE BRONX.

Consolidated Gas Company (Welsbach Gas Lamps).

Location.	Number of Lamps.
Aldus street, Southern boulevard to Longfellow street	13
Bassford avenue, east side, south of One Hundred and Eighty-third street	1
Cedar avenue, west side, opposite Sedgwick avenue	1
Charlotte avenue and One Hundred and Seventieth street, and east and west sides, north One Hundred and Seventieth street	7
College avenue and One Hundred and Sixty-fifth street, and east and west sides, north One Hundred and Sixty-fifth street	4
Concord avenue and One Hundred and Forty-fourth street, and west side, north One Hundred and Forty-fourth street and corner of One Hundred and Forty-fifth street	5
Concord avenue, east and west sides, south of Two Hundred and Thirty-ninth street	2

Location.	Number of Lamps.
Crotona avenue, southeast corner of Southern boulevard	1
Crotona Park East, southeast corner of Wilkins place, and north side, 1 west Southern boulevard	2
Crotona Park East, west side, 1 north Charlotte (1), east and west sides, 1 and 2 north Prospect (4)	5
Cypress avenue, east and west sides, north of One Hundred and Forty-first street	5
Dawson street and Intervale avenue, west side, 1 south Dongan street	2
Evelyn place, northeast corner of Davidson avenue, south side, 1 east Davidson avenue	2
Fairmount place, southeast corner of Prospect avenue (church), north side, 2 east of Prospect	2
Faile street, Aldus street and Guttenburg street	4
Fox street, north and south sides, east of Prospect avenue (5), southwest corner of St. Johns avenue (1), east and west sides, north One Hundred and Fifty-sixth street (2)	8
Fulton avenue, east and west sides, north Wendover avenue (2), northeast corner of One Hundred and Seventy-third street (1); east side, north One Hundred and Seventy-third street (2)	5
Grand avenue, east and west sides, south of Burnside avenue	5
Grant avenue, east side, 1 north of One Hundred and Sixty-third street	1
Heath avenue, east and west sides, south of Kingsbridge road	4
Hewitt place (church), east side, opposite Macy place	2
Jennings street, north and south sides, east Stebbins avenue; north side, east Hoe avenue	3
Jennings street, south side, 1 east Vyse avenue; north side, 1 east Bryant; north side, 1 east Minford place	3
Jennings street, south side, opposite Minford place; north and south sides, 1 east Wilkins	3
Longfellow avenue, northeast corner Jennings; east and west sides, 1 north Jennings	3
Marmion avenue, east side, 1 north Crotona Park North	1
Morris avenue (church), west side, south of Fordham road	1
Mosholu parkway, south side, Two Hundred and Fourth and Two Hundred and Sixth streets	5
Oakland place, south side, 1 east of Belmont avenue	1

Location.	Number of Lamps.
Perry avenue, east and west sides, north Two Hundred and Fifth street	2
Park Avenue East, east side, north and south of One Hundred and Eighty fifth street; 1 and 2 north of One Hundred and Eighty-sixth street, junction of Third avenue	5
Simpson street, east and west sides, south Westchester avenue	4
Southern boulevard, west side, 1 and 2 north of Crotona avenue (2), west side, north of One Hundred and Seventy-sixth street (1); northwest corner of Fairmount place (1)	4
Southern boulevard, southwest corner of Elsmere place (1); west side, 1 north of Elsmere place (1); west side, 1 north of One Hundred and Seventy-ninth street (1); northwest corner of One Hundred Seventy-ninth street (1)	4
Stebbins avenue, east side, 1 north of Westchester avenue; west side, 1 south of One Hundred and Sixty-third street	2
Stebbins avenue, east side, 1 north of Home street	1
St. Marys street, southwest corner of Crimmins avenue; south side, 1 east of Crimmins avenue	2
St. Marys street, north side, 1, 2, 3 east of St. Anns avenue; southwest corner of Beekman avenue	4
St. Pauls place, north side, 1 east of Washington avenue	1
Teller avenue, east and west sides, north of One Hundred and Sixty-ninth street	7
Vyse avenue, northeast corner of West Farms road; east and west sides, north of West Farms road	5
Walton avenue, east and west sides, north of One Hundred and Fifty-eighth street (2); northeast corner of One Hundred and Fifty-ninth street (1); east and west sides, north of One Hundred and Seventy-ninth street (4)	7
Walton avenue, east and west sides, north of Burnside avenue (5); southeast corner of One Hundred and Eighty-first street (1); east and west sides, north of One Hundred and Seventy-seventh street (2)	8
Walton avenue, east and west sides, south of Fordham road	3
Whitlock avenue, northwest corner of Barretto street (1); east and west sides, north of Barretto street (5)	6
One Hundred and Forty-fourth street, south side, east of Concord street (1); northwest corner of Wales avenue (1), north side; 1 east of Wales avenue (1)	3

Location.	Number of Lamps.
One Hundred and Forty-sixth street (synagogue), south side, 1 and 2 east of Brook avenue	2
One Hundred and Sixty-ninth street, southwest corner of Clay avenue (1); north side, 1 east of Tellar avenue (1); southeast corner of Teller avenue (1); northwest corner of Teller avenue (1)	4
One Hundred and Sixty-ninth street, south side, 1 east of Findlay avenue (1); northeast corner of Findlay avenue (1); southwest corner of Findlay avenue (1)	3
One Hundred and Sixty-ninth street, north side, 1 east of College avenue; southeast corner of College avenue	2
One Hundred and Seventy-ninth street, south side, 1 east of Mohegan avenue; north side, 1 east of Honeywell avenue	2
One Hundred and Seventy-ninth street, north side, 1 east of Daly avenue; north side, 1 east of Arthur avenue	2
Two Hundred and Sixth street, north and south sides, west of Perry avenue	3
Two Hundredth street, south side, 1 east of Perry avenue	1
Two Hundred and Thirty-ninth street, south side, 1 west of Catharine street	1
Two Hundred and Forty-second street, northwest corner of Barnes avenue	1
Total	190

BOROUGH OF MANHATTAN.

Welsbach Street Lighting Company of America (Welsbach Naphtha Lamps).

Location.	Number of Lamps.
Central Park	9
One Hundred and Twenty-first street, north and south sides, east of Broadway	6
Riverside drive, north of One Hundred and Sixteenth street	6
Colonial Park	2
Blackwells Island	19
Jumel place, north of One Hundred and Sixty-seventh street	6
Fairview avenue, Broadway to St. Nicholas avenue	7
Total	55

Location.	Number of Lamps.
Bronx Park	4
Bancroft street, between Hoe and Faile (1); northwest and southeast corners of Faile street (2)	3
Barker avenue, east side, south of Two Hundred and Seventh street	1
Clay avenue, southeast and northwest corners of One Hundred and Sixty-seventh street (2); east and west side, north of One Hundred and Sixty-seventh street (5); northwest corner of One Hundred and Sixty-eighth street (1)	8
Clay avenue, east and west sides, north of One Hundred and Sixty-eighth street	5
Crotona Park	2
Creston avenue, west side, north Burnside (3); east side, 1 north of Burnside (1)	4
Creston avenue, east side, north of One Hundred and Eightieth street (1); southeast corner of One Hundred and Eighty-first street (1); east and west sides, north of One Hundred and Eighty-first street (5)	7
Creston avenue, southeast corner of One Hundred and Eighty-second street	1
Cruger avenue (church), west side, north of Burnett place	2
Clarke place, south side, east of Jerome avenue; southwest corner of Walton avenue	2
Carpenter avenue, west side, between Two Hundred and Nineteenth and Two Hundred and Thirty-second streets	14
Gunther avenue, east side, north of Two Hundred and Thirty-third street (1); southwest corner of Edenwald avenue (1)	2
Gunther avenue, east and west sides, north of Edenwald avenue	5
Jennings street, south side, east of Southern boulevard (1); south side, 1 east of Longfellow avenue (1)	2
Jennings street, northwest and southeast corners Boone avenue	2
Louise avenue, east side, 1 south of Burnett place	1
Morris avenue, east and west sides, south of One Hundred and Eighty-first street (3); southeast and northwest corners of One Hundred and Eighty-first street (2); east side, 1 north of One Hundred and Eighty-first street (1)	6
Oakley street, east and west sides, north of Miami street (3); southwest corner of Sagamore street (1)	4

Location.	Number of Lamps.
Parkview place, east side, north of Tee Taw avenue	4
Perry avenue, east side, between Two Hundred and Sixth and Two Hundred and Seventh streets	1
Paulding street, east side, between Two Hundred and Fourteenth and Two Hundred and Sixteenth streets	2
Simpson street, Dongan street, north to middle of block	4
Walton avenue, east and west sides, north of One Hundred and Eighty-fourth street (6); south of Tremont avenue (2)	8
One Hundred and Fifty-ninth street, north and south sides, east of Walton avenue (2); Walton avenue, east side, north of One Hundred and Fifty-ninth street (1)	3
One Hundred and Seventy-third street, north side of Eastern boulevard (1); southeast corner of Hoe avenue (1); north side, 1 east of Hoe avenue (1); southeast corner of Vyse avenue (1)	4
One Hundred and Seventy-sixth street, southeast corner of Trafalgar place (1); north side, east of Marmion avenue (3); southeast corner of Waterloo place (1)	5
One Hundred and Seventy-eighth street, north and south sides, east of Vyse avenue	2
One Hundred and Eighty-ninth street, south and north sides, east of Washington avenue (3); northwest corner of Bathgate avenue (1)	4
One Hundred and Eighty-ninth street, south side, 1 east of Bathgate avenue (1); north side, 1 east of Lorillard place (1)	2
Two Hundred and Thirty-first street, north and south sides, east of Carpenter avenue	4
Two Hundred and Thirty-third street, north side, east of White Plains road (1); north side, west of Barnes (1); southeast corner of Barnes (1)	3
Two Hundred and Thirty-third street, north side, 1 east of Barnes (1); south side, 1 east of Bussing avenue (1); southwest corner of Bronxwood (1)	3
Two Hundred and Thirty-third street, south side, east of Bronxwood (1); south side, 1 and 2 east of Edenwald (2); northwest corner of Carter (1)	4
Two Hundred and Thirty-fourth street, northeast corner of First street (1); north side, east of Carpenter (2)	3
Total	131
On streets previously lighted by ordinary naphtha lamps	1,230
Grand Total, The Bronx	1,361

TABLE

Showing Mileage of Streets Lighted by Electric, Gas and Naphtha

	Electric, Arc.		Electric, Incandescent.	
	Miles.	Feet.	Miles.	Feet.
January 1, 1906	156	3,242		
Additional during 1906	14	230		
Discontinued during 1906		1,400		
December 31, 1906	170	2,072		
The Bronx.				
January 1, 1906	132	4,157	10	4,240
Additional during 1906	6	2,870		400
Discontinued during 1906				
December 31, 1906	139	1,747	10	4,640
Total, Manhattan and The Bronx	309	3,819	10	4,640

* Ordinary naphtha lamps in Manhattan and The Bronx changed to Welsbach naphtha, and

G.

Lamps in Manhattan and The Bronx During the Year 1906.

Gas, Welsbach.		Naphtha, Ordinary.		Naphtha, Welsbach.		Total.	
Miles.	Feet.	Miles.	Feet.	Miles.	Feet.	Miles.	Feet.
278	1,069		3,700	6	4,770	442	2,221
2	515			1	4,095	17	4,840
14	4,105	*....	3,700		750	15	4,675
265	2,759			8	2,835	444	2,386
129	3,640	30	4,579	10	1,807	314	2,583
3	4,685			33	4,139	44	1,534
4	880	*30	4,579		2,275	35	2,454
129	2,165			43	3,671	323	1,663
394	4,924			52	1,226	767	4,049

*mileage for each borough for ordinary added to Welsbach naphtha.

TABLE H.

Showing Length of Mains in Use by Each Gas Company in Manhattan and The Bronx During the Year 1906.

Company.	Number of Feet of Mains in Use January 1, 1906.	Number of Feet of New Mains Laid.	Number of Feet of Mains Abandoned.	Number of Feet of Mains Taken Up.	Number of Feet of Mains in Use December 31, 1906.
MANHATTAN.					
Consolidated Gas Company....	4,234,101	22,949	12,871	7,943	4,236,236
New Amsterdam Gas Company.	1,321,088	273	1,679	5,465	1,314,217
Standard Gas Light Company..	1,069,706	24			1,069,730
Total, Manhattan.....	6,624,895	23,246	14,550	13,408	6,620,183
THE BRONX.					
Consolidated Gas Company....	14,157				14,157
Central Union Gas Company..	641,244	35,510	5,859	4,896	665,999
Northern Union Gas Company.	770,189	56,872		11,121	815,940
Westchester Lighting Company.	150,445	1,487			151,932
Total, The Bronx.....	1,576,035	93,869	5,859	16,017	1,648,028
Grand total, Manhattan and The Bronx.....	8,200,930	117,115	20,409	29,425	8,268,211

TABLE I.

Showing the Number of Outages and the Amounts Deducted Therefor from the Bills of Electric, Gas and Naphtha Lamps in Manhattan and The Bronx, for the Contract Period from February 1, 1906, to December 31, 1906, Inclusive.

Borough	February		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Grand Total During Period.	
	Number of Outages.	Amount Deducted	Number of Outages.	Amount Deducted.	Number of Outages	Amount Deducted	Number of Outages.	Amount Deducted.	Number of Outages.	Amount Deducted.	Number of Outages.	Amount Deducted.	Number of Outages.	Amount Deducted	Number of Outages.	Amount Deducted.	Number of Outages.	Amount Deducted.	Number of Outages.	Amount Deducted	Number of Outages.	Amount Deducted.	Number of Outages.	Amount Deducted.
Manhattan—																								
Electric	220	$39 34	313	$55 46	318	$61 11	245	$44 49	219	$40 01	319	$60 85	303	$55 45	230	$41 11	280	$48 57	396	$74 93	465	$86 29	3,308	$607 60
Gas	2,002	65 70	2,013	66 04	1,888	61 95	2,003	65 73	1,613	52 91	1,408	46 28	1,020	33 52	1,179	38 70	1,458	47 84	1,854	60 90	2,779	91 29	19,217	630 86
Naphtha	186	15 08	266	18 97	44	3 30	38	2 72	29	2 14	68	4 97	79	5 09	159	12 02	104	7 59	143	10 81	340	24 85	1,456	107 54
Total, Manhattan	2,408	$120 12	2,592	$140 47	2,250	$126 36	2,286	$112 94	1,861	$95 06	1,795	$112 09	1,402	$94 06	1,568	$91 83	1,842	$104 00	2,393	$146 64	3,584	$202 43	23,981	$1,346 00
The Bronx—																								
Electric	484	$93 64	250	$51 59	695	$160 82	562	$122 02	295	$47 09	253	$49 21	178	$66 25	140	$61 08	585	$89 85	332	$61 45	864	$162 89	5,038	$965 89
Gas	236	8 09	203	6 67	195	6 41	162	5 32	236	7 76	109	3 58	101	3 32	69	2 26	282	9 27	340	11 18	506	16 63	2,449	80 49
Naphtha	4	25	22	1 34	8	53			6	45	11	64	20	1 43	3	21	9	66	27	2 01	193	14 11	303	21 63
Total, The Bronx	734	$101 98	475	$59 60	898	$167 76	724	$127 34	537	$55 30	373	$53 43	499	$71 00	412	$63 55	876	$99 78	699	$74 64	1,563	$193 63	7,790	$1,068 01
Manhattan and The Bronx	3,142	$222 10	3,067	$200 07	3,148	$294 12	3,010	$240 28	2,398	$150 36	2,168	$165 52	1,901	$165 06	1,980	$155 38	2,718	$203 78	3,092	$221 28	5,147	$396 06	31,771	$2,414 01

TABLE J.

Time Table for Lighting and Extinguishing Public Electric, Gas and Naphtha Lamps for the Year 1906.

Date.	Complete Lighting in One Hour. (From Time Given.)	Complete Extinguishing in 50 Minutes. (From Time Given.)	Hours Per Night.	Hours Per Week.	Hours Per Month.
	p. m.	a. m.			
Jan. 1.....	4.12	6.27	14.15	99.45	
8.....	4.22	6.22	14.00	98.00	
15.....	4.32	6.17	13.45	96.15	
22.....	4.42	6.12	13.30	94.30	
29.....	4.47	6.07	13.20	93.20	
					481.50
Feb. 5.....	4.57	6.02	13.05	91.35	
12.....	5.07	5.57	12.50	51.20 (4 days)	
16.....	5.07	5.52	12.45	38.15 (3 days)	
19.....	5.17	5.47	12.30	50.00 (4 days)	
23.....	5.17	5.42	12.25	37.15 (3 days)	
26.....	5.22	5.32	12.10	48.40 (4 days)	
					317.05
Mar. 2.....	5.22	5.27	12.05	36.15 (3 days)	
5.....	5.32	5.17	11.45	82.15	
12.....	5.42	5.07	11.25	79.55	
19.....	5.52	4.57	11.05	77.35	
26.....	5.57	4.47	10.50	75.50	
					351.50
April 2.....	6.07	4.37	10.30	42.00 (4 days)	
6.....	6.07	4.32	10.25	31.15 (3 days)	
9.....	6.17	4.22	10.05	70.35	
16.....	6.27	4.17	9.50	29.30 (3 days)	
19.....	6.27	4.12	9.45	39.00 (4 days)	
23.....	6.37	4.02	9.25	65.55	
30.....	6.47	3.52	9.05	63.35	
					341.50
	p. m.	a. m.			
May 7.....	6.57	3.42	8.45	35.00 (4 days)	
11.....	6.57	3.37	8.40	26.00 (3 days)	
14.....	7.07	3.27	8.20	58.20	
21.....	7.12	3.22	8.10	57.10	
28.....	7.12	3.17	8.05	56.35	
					233.05

Date.	Complete Lighting in One Hour. (From Time Given.)	Complete Extinguishing in 50 Minutes. (From Time Given.)	Hours Per Night.	Hours Per Week.	Hours Per Month.
	p. m.	a.m.			
June 4.....	7.17	3.12	7.55	55.25	
11.....	7.17	3.07	7.50	54.50	
18.....	7.22	3.07	7.45	54.15	
25.....	7.27	3.07	7.40	53.40	
					218.10
July 2.....	7.22	3.07	7.45	54.15	
9.....	7.17	3.12	7.55	55.25	
16.....	7.12	3.17	8.05	56.35	
23.....	7.07	3.22	8.15	57.45	
30.....	7.02	3.27	8.25	58.55	
					282.55
Aug. 6.....	6.57	3.37	8.40	60.40	
13.....	6.47	3.47	9.00	63.00	
20.....	6.37	3.52	9.15	64.45	
27.....	6.27	3.57	9.30	66.30	
					254.55
Sept. 3.....	6.17	4.07	9.50	39.20 (4 days)	
7.....	6.12	4.07	9.55	29.45 (3 days)	
10.....	6.02	4.17	10.15	71.45	
17.....	5.52	4.27	10.35	42.20 (4 days)	
21.....	5.47	4.27	10.40	32.00 (3 days)	
24.....	5.37	4.37	11.00	44.00 (4 days)	
28.....	5.32	4.37	11.05	33.15 (3 days)	
					292.25
Oct. 1.....	5.22	4.42	11.20	79.20	
8.....	5.12	4.52	11.40	58.20 (5 days)	
13.....	5.07	4.52	11.45	23.30 (2 days)	
15.....	4.57	5.02	12.05	84.35	
22.....	4.47	5.07	12.20	86.20	
29.....	4.37	5.17	12.40	88.40	
					420.45
Nov. 5.....	4.27	5.27	13.00	91.00	
12.....	4.17	5.32	13.15	92.45	
19.....	4.12	5.42	13.30	94.30	
26.....	4.07	5.52	13.45	96.15	
					374.30

Date.	Complete Lighting in One Hour. (From Time Given.)	Complete Extinguishing in 50 Minutes. (From Time Given.)	Hours Per Night.	Hours Per Week.	Hours Per Month.
	p. m.	a. m.			
Dec. 3.....	4.02	5.57	13.55	97.25	
10.....	3.57	6 07	14.10	99.10	
17.....	3.57	6.17	14.20	100.20	
24.....	4.02	6.22	14.20	28.40 (2 days)	
26.....	4.07	6.22	14.15	71.15 (5 days)	
31.....	4.12	6.27	14.15	14.15 (1 day)	
					411.05
					3,980.25
Deduct, on account of 50 minutes extinguishing time.....					30.25
Total number of hours burning.....					3,950.00

New York, January 1, 1906.

The above time table will show the time for lighting and extinguishing public electric lamps for the year 1906, all lamps to be lighted within one hour from the time of beginning to light, and extinguished within fifty minutes of the time of beginning to extinguish.

WM. B. ELLISON,
Commissioner, Department of Water Supply, Gas and Electricity.

C. F. Lacombe, Chief Engineer of Light and Power.

Department of Water Supply, Gas and Electricity,
Bureau of Lamps and Gas,
Nos. 13 to 21 Park Row,
New York, December 31, 1906.

Mr. CHARLES F. LACOMBE, Chief Engineer of Light and Power, Nos. 13 to 21 Park Row, New York:

Dear Sir—In accordance with your instructions, I hand you herewith data, tables, etc., as my report of work performed in this office during the year 1906.

Just before the beginning of the year, on account of your having been made Chief Engineer of Light and Power of the greater city, a general plan of reorganization of the Bureau was discussed and put into effect early in 1906. My duties as General Inspector over that part of the Bureau of Lamps and Gas, in which the general office and daily street inspection work is carried on, were largely increased. The Inspectors doing daily street work in the Borough of Manhattan were placed under my charge.

On account of the steadily increasing business of the Bureau, immediate steps were taken toward improving the system of handling the same. Recommendations were made proposing changes in the reports of the Inspectors, and a better method of keeping different records of the Bureau, which would make the work simpler and more accurate. These recommendations were adopted, and new forms of Inspectors' Daily Day, and Daily Extinguishment reports, as well as Special Reports, were compiled and immediately put into use. Some of the old record books were discarded altogether, and new ones of better denomination were substituted therefor.

These changes soon began to show good results. It was made posible to know just what each and every Inspector did each day, and considerably lessened the length of time for him to remain in the office to receive instructions and attend to other minor details, thereby giving him more time to spend on his district. Concerning the new records, more accurate results were obtained, owing to the nature of the additional information required in checking the reports and bills submitted by the different lighting companies of the Boroughs of Manhattan and The Bronx, as well as the doing away with a lot of unnecessary double entry work.

The new system of filing communications that was started last year has also been improved upon of late, and it has been made possible for but one man to file away all the letters and communications of citizens and other persons, as well as the reports of the Inspectors and General Inspectors of the different Boroughs.

The system in general of handling the work of the Bureau was considered so good, that in the latter part of the year you instructed me to inquire into the business methods of the Bureau in the Borough of Brooklyn, and of Queens, and to establish a similar working system in said Boroughs.

For the benefit of the General Inspectors now detailed in these Boroughs, requisitions have been made for the necessary books, and other blanks, in order that the system of handling the work of the Bureau throughout the greater city may be uniform, as far as possible.

The Inspection Service.

The Inspection Force for the Borough of Manhattan, during the first nine months of the year, consisted of eight men doing regular district work.

With the increasing number of public lamps erected, and the public demanding an increased lighting service on our public highways and parks, it was apparent that these few men were entirely inadequate to properly look after an average of 21,311 public lamps, lighting upward of 444 miles of highway in this Borough, and in October you detailed two additional men to district work.

Soon after the assignment to street work of these additional men ,the Borough was reapportioned into ten inspection districts, one district being assigned to each Inspector. The system of inspection was revised, whereby the work of an Inspector consisted of four hours day work and three hours night work, actual working time.

As most of the inspection districts were subdivided into six sections, an Inspector was required to personally examine every public lamp-post in his district in the daytime, once a week—one section per day, in rotation, being inspected.

In going over his district in this manner, he made note of all repairs necessary to lamp-posts, and checked all repair items reported performed by the lighting companies on their regular reports to this Bureau, if the same had been properly attended to, as per order of the Department. It was also part of an Inspector's day work to witness the refitting of all pipes be found necessary to order refitted to public lamp-posts, in place of any of these pipes which had become useless through becoming rotten, or clogged up with condensation or sediment, which could not be cleared by use of force pump and rod. Special inspections were also made by him when required to do so.

In the three hours night work, the Inspector, as far as possible, covered his entire district, reporting upon the general lighting conditions, and all lamps either not burning (see Table "B," hereto attached) or improperly burning, as well as upon defective lighting (see Table "A"). He was also required to inspect all lamps reported by the lighting companies as being either newly lighted, or discontinued, and then to check the items of said lamps so reported, on report submitted by them.

For three days at the end of every month the Inspectors were obliged to give up the regular district inspection work, to read meters, both gas and electric, in all of the public buildings in each of their respective districts.

In regard to the work performed by the Inspectors, the writer begs leave to refer you to Tables "A" and "B," which were compiled from data on the reports of the inspectors, and which gave the following information:

Table A shows in a condensed form the number of notices sent in 1906 to the lighting companies of the Borough of Manhattan, to the Borough President, and to the Fire Department, regarding miscellaneous repairs needed to public street lamps.

As will be noted on this table, there were reported by our Inspectors 4,242 broken mantles during the year in Manhattan. This is comparatively a very small number of lamps out of commission, on account of broken mantles, considering that there was an average of 17,516 mantle gas and mantle naphtha lamps in said Borough during the year.

Table B shows a comparative statement of the number of gas, naphtha and electric lamp extinguishments reported by our Inspectors, the police and the lighting companies in the Boroughs of Manhattan and The Bronx during the year 1906.

As will be seen on this table, 19,627 estinguishments were reported by our Inspectors, 12,761 by the police, and 4,130 by the lighting companies, making a grand total of 36,518 extinguishments. As 1,760 of these were duplicates, however, i. e., the same items being reported both by our Inspectors and by the police, they were deducted from the grand total, making the net number of extinguishments for the year 34,758.

Considering that there was an average of 31,548 public gas, naphtha and electric lamps in commission during the year in the Boroughs of Manhattan and The Bronx, and the many hindrances that arise daily to perfect lighting service, it cannot be denied that the lighting service, as far as maintenance of lamps is concerned, was exceptionally good.

Fewer complaints regarding lighting were received during the past year than for several years previous, and in practically all cases where the complaint was received of a lamp being out of commission, a report had already been made to this office.

Table C shows net number of gas, naphtha and electric lamp extinguishments reported each month during the year 1906 by our Inspectors, the police and the lighting companies, and the companies against which the extinguishments were charged.

Regarding the Borough of The Bronx, the inspection force consisted of six men under the supervision of General Inspector Hugh F. McLaughlin. All work of a routine character was conducted by him, and regular reports of the work of the Inspectors were duly sent to this office. In regard to the more detailed work required in the ordering of repairs to lampposts, the checking of bills and reports of the lighting companies, the investigation of complaints of lighting, the requests for additional lamps or changes in location of existing lamps, the same were all handled directly from this office and finally disposed of after having received the attention of the General Inspector in the regular way.

During the year there were in commission an average of 10,237 public gas, naphtha and electric lamps, lighting upward of 767 miles of highways in the Borough of The Bronx. No data is submitted herewith regarding the miscellaneous repairs ordered performed to the public lamps in said Borough, however, on account of the small number of same.

The Work of the Office and the Office Working Force.

During the year there were 730 lighting orders and 537 repair orders sent to the various lighting companies of the Boroughs of Manhattan and The Bronx.

The work performed on the lighting orders consisted of the erection and lighting of 2,408 new gas, naphtha and electric lamps; the relighting of 871 gas and naphtha lamps, and the discontinuance of 3,530 gas and naphtha lamps.

Under repair orders, the lighting companies performed 2,992 repairs to the public gas lampposts in the Borough of Manhattan, and 1,023 repairs in the Borough of The Bronx. Orders were also given for the painting of the public gas lampposts in said Boroughs; 15,862 were painted in Manhattan, while 5,987 were painted in The Bronx.

All of these items which appeared on bills submitted by the lighting companies, before being audited, were regularly checked by our Inspectors, and then rechecked in the records of this office.

The Inspectors' daily day and daily extinguishment reports were carefully gone over, and as a result, as is shown in Table A, 7,255 notices were sent to the lighting companies in the Borough of Manhattan regarding miscellaneous repairs to public lamps, 359 notices to said companies to apply force pump to pipes of gas lamp-posts in an endeavor to clear the same, and 554 notices of broken street signs were sent to the Borough President.

Tables B and C show the net number of extinguishments that were reported by our Inspectors, the police and the lighting companies in the Boroughs of Manhattan and The Bronx, for which there was a deduction made on the lighting companies' bills of $2,737.55. As noted in said tables there were 34,758 extinguishments reported during the year. To reach this figure a careful comparison is made between the reports submitted by the lighting companies, those of our Inspectors, and those of the police, in order to avoid duplicating a charge for the same extinguishments. These reports are carefully filed away, and can be referred to on short notice by reference to our Extinguishment Records, which are kept up to date.

A record was also kept of all lamp material given to the different lighting companies of the Boroughs of Manhattan and The Bronx during the year. Table D, hereto attached, shows the same in detail, and material on hand December 31, 1906.

Permits were issued to six private citizens during the year for the erection, lighting and maintaining, at their own respective cost and expense, of gas and electric lampposts on public highways, on condition that said lampposts be lighted and extinguished in accordance with Schedule for the Lighting and Extinguishing of Public Lamps. Table E, hereto attached, shows the same in detail.

During the year there were a number of public lampposts damaged by private persons, and as a result of the investigation conducted by our Inspectors as to the parties responsible, upon communicating with them in regard to same, the sum of $330.30 was collected. Table F, hereto attached, shows in detail the claims collected. It is further stated, in connection with this matter, that during the year the following work was performed to public lamp-posts at the expense of private persons:

Lampposts removed	50
Lampposts reset	26
Service pipes refitted	4
Standpipes refitted	2
Columns releaded	2
Posts straightened	1

The above work was charged to these individuals, either on account of their having damaged the lampposts, or that the lampposts were to be removed or reset to permit construction work of some kind.

The daily reports of the Chief Gas Examiner of the different photometric stations of the greater city were kept on file, and duplicate copies of such of them showing violations of the statutes of this State were duly transmitted to the Corporation Counsel for his attention.

The regular weekly report of the Bureau, of work done to public lamps and lampposts in the Boroughs of Manhattan and The Bronx, as required by statute, was compiled and duly transmitted to the Commissioner of this Department.

In addition to the above, the general work of correspondence with private citizens, the City departments, etc., regarding public lamps in the Boroughs of Manhattan and The Bronx, was carried on.

The office working force consisted of four men doing clerical work, and a Stenographer, all of whom may be commended for their services.

The Inspectors doing regular district work on the streets should also be commended, as they appear to show much interest in their work, and were efficient in the performance of it.

PRIMO PORCELLO,
General Inspector.

TABLE A.

The following is a statement showing in condensed form the number of notices sent in 1906 to the lighting companies of the Borough of Manhattan, the Borough President and the Fire Department, regarding miscellaneous repairs needed to public street lamps.

	Lamps Broken.	Globes Broken.	Domes Broken.	Tops Broken.	Mantles Broken.	Miscellaneous Repairs to Lamps.	Total.
Consolidated Gas Company	69	1,813	529	166	4,211	325	7,113
New Amsterdam Gas Company						5	5
Welsbach Street Lighting Company of America	3	16	10		31	15	75
New York Edison Company		4				52	56
United Electric Light & Power Company						6	6
Total	72	1,833	539	166	4,242	403	7,255

Pipes of lamp-posts to be cleared by use of force pump	359
Broken fire alarm boxes reported to the Fire Department	21
Broken street signs reported to the Borough President	540

TABLE B.

Comparative Statement Showing the Number of Gas, Naphtha and Electric Lamp Extinguishments Reported by Our Inspectors, the Police and the Lighting Companies in the Boroughs of Manhattan and The Bronx, During the Year 1906.

	Reported by Inspectors.	Reported by Police.	Reported by Lighting Companies.	Total Reported.	Deduct as Duplicates.	Net Extinguishments.
Gas Lamps.						
Consolidated Gas Company—						
Open Flame	62	6		68		68
Mantle	15,110	9,580		24,690	964	23,726
New Amsterdam Gas Company—						
Open Flame	20			20		20
Standard Light Company—						
Open Flame	1			1		1
Total Gas Lamps	15,193	9,586		24,779	964	23,815
Naphtha Lamps.						
New York & New Jersey Globe Gas Light Company—						
Open Flame	47	73		120		120
Welsbach Street Lighting Company of America—						
Mantle	1,372	441		1,813		1,813
Total Naphtha Lamps	1,419	514		1,933		1,933
Electric Lamps.						
New York Edison Company—						
Manhattan District	422	740	2,214	3,376	264	3,112
United District	83	211	186	480	88	392
Bronx District	1,103	370	1,730	3,203	364	2,839
Westchester District	858	900	1,758	1,758	48	1,710
Westchester Lighting Company	80	38		118	3	115
Bronx Gas & Electric Company	469	402		871	29	842
Total Electric Lamps	3,015	2,661	4,130	9,806	796	9,010
Total Gas Lamps	15,193	9,586		24,779	964	23,815
Total Naphtha Lamps	1,419	514		1,933		1,933
Total Electric Lamps	3,015	2,661	4,130	9,806	796	9,010
Grand Total	19,627	12,761	4,130	36,518	1,760	34,756

TABLE

Comparative Statement Showing the Net Number of Gas, Naphtha and Electric Lamp in the Boroughs of Manhattan and The

Company.	January	February.	March.	April.
GAS LAMPS.				
Consolidated Gas Company (open flame)	12	7	9	7
Consolidated Gas Company (mantle)	2,134	2,235	2,204	2,071
New Amsterdam Gas Company (open flame)	2	6	3	5
Standard Gas Light Company (open flame)				
Total gas lamps	2,148	2,248	2,216	2,083
NAPHTHA LAMPS.				
New York and New Jersey Globe Gas Light Company (open flame)	7	4	45	5
Welsbach Street Lighting Company of America (mantle)	164	186	243	47
Total naphtha lamps	171	190	288	52
ELECTRIC LAMPS.				
New York Edison Company—				
Manhattan District	190	210	282	270
United District	6	10	31	48
Bronx District	241	146	180	89
Westchester District	134	253	27	492
Westchester Lighting Company	17	14	1	60
Bronx Gas and Electric Company	79	71	42	54
Total electric lamps	667	704	563	1,013
Total gas lamps	2,148	2,248	2,216	2,083
Total naphtha lamps	171	190	288	52
Total electric lamps	667	704	563	1,013
Grand total	2,986	3,142	3,067	3,148

C.

Extinguishments Reported by Our Inspectors, the Police and the Lighting Companies, Bronx, Each Month, During the Year 1906.

May.	June.	July.	August.	September.	October.	November.	December.	Total.
7	7		1	3	6	3	6	68
2,158	1,839	1,516	1,120	1,245	1,734	2,191	3,279	23,726
....	3	1						20
....			1					1
2,165	1,849	1,517	1,122	1,248	1,740	2,194	3,285	23,815
3	2	9	42	1		2		120
35	33	70	57	164	113	168	533	1,813
38	35	79	99	165	113	170	533	1,933
242	202	302	277	207	224	322	384	3,112
3	17	17	26	23	56	74	81	392
223	202	122	283	193	390	234	536	2,839
170	5	84	55	70	146	11	263	1,710
3						1	19	115
166	93	42	40	77	44	88	46	842
807	519	567	681	570	860	730	1,329	9,010
2,165	1,849	1,517	1,122	1,248	1,740	2,194	3,285	23,815
38	35	79	99	165	113	170	533	1,933
807	519	567	681	570	860	730	1,329	9,010
3,010	2,403	2,163	1,902	1,983	2,713	3,094	5,147	34,758

TABLE

Inventory of the Disposition of Supplies for Repairs to

Items.	
Boulevard globes	
Boulevard tops	
Boulevard reflectors	
Boulevard band globes	
Bridge globes	
Bridge tops	
Bridge reflectors	
Brackets, single prong	
Brackets, double prong	
Brackets, flange	
Brackets, transverse road	
Crossheads, boulevard	
Crossheads, corporation	
Crossheads, empire	
Fire alarm lamps	
Fire alarm signs	
Fire alarm glasses (small segments), sets	
Fire alarm glasses (large segments), sets	
Lamp-irons, boulevard	
Lamp-irons, square	
Lamp-posts, butts of (sub-base style)	
Lamp-posts, butts of (flange style)	
Lamp-posts, columns of	
Lamp-posts, corporation (sub-base style	
Lamp-posts, corporation (flange style)	
Lamp-posts, boulevard	
Lamp-posts, empire (sub-base style)	
Lamp-posts, empire (flange style)	
Lamp-posts, ornamental	
Minor globes, plain	
Minor globes, green	
Minor lamps	
Police globes, boulevard size	
Police globes, bridge size	
Square lanterns	
Viaduct lamps	

* Storehouse, No. 31 Perry street; storeyard, foot of West Fifty-sixth street.

D.

Public Gas Lamps and Lamp-posts During the Year 1906.

*On Hand in Storehoues and Storeyard, December 31, 1905.	Material Received in 1906, by Virtue of Department Requisition.	Material Given to Lighting Companies During the Year.		Material on Hand December 31, 1906.		
		Borough of Manhattan.	Borough of The Bronx.	In Department Storehouse and Storeyard.	In Gas Company's Storeyard.	
					Consolidated Gas Company.	Northern Union Gas Company.
657		2		655	6	
350		2		348	20	
474		2		472	18	
3				3		
10				10		
37				37		
35				35		
22				22		
27	25	36		16		
10		3		7		
8	5	9		4	9	
3				3		
1,310				1,310	238	
98				98		
15				15	†24	
49				49		
274	600	375		499		
374	600	100		874		
234		2		232	251	
356				356	293	
2				2	357	37
....					20	
....					712	33
267				267		
46		1		45		
....					2	
75				75		
20		10		10		
1	3	3		1		
163				163	8	
2				2		
100				100		
148		4	3	141	1	
3				3		
57				57	6	
7				7		

† Old.

TABLE E.

Showing Permits Granted for Erection of Private Lamps on Public Highways During the Year 1906.

To Whom Granted.	Date of Permit.	Lamps to Be Erected.
Knickerhocker Hotel, Broadway, southeast corner of Forty-second street, city.....	Jan. 2, 1906	Nine (9) posts, with twenty-four (24) 16 candle-power incandescent electric lamps on each post.
A. D. Lindeman, No. 153 Rivington street, city	Jan. 6, 1906	One (1) gas post with a mortar-shaped lamp attached.
Prince George Hotel, Twenty-eighth street, between Fifth and Madison avenues, city	Jan. 11, 1906	Two (2) posts, with four (4) 16 candle-power incandescent electric lamps on each post.
New York Edison Company, No. 27 East One Hundred and Twenty-fifth street, city.	June 25, 1906	Post with one (1) 450 watt electric arc lamp thereon.
Thomas P. Corcoran, No. 55 East Seventy-sixth street, city.....	Oct. 22, 1906	Two (2) posts, with three (3) 16 candle-power and one (1) 32 candle-power incandescent electric lamps on each post.
Park Avenue Hotel, Park avenue, between Thirty-second and Thirty-third streets, city.	Dec. 7,1906	Twenty-one (21) Corinthian columns with six (6) 32 candle-power incandescent electric lamps on each column.

TABLE F.

The following schedule shows claims collected during the year 1906 by the Department, through this office, from the persons named therein, for the cost of repairs, as a result of damage done to lamp-posts by said persons or their representatives:

Date.	Location of Post.	Persons Responsible.	Amount Collected.
Jan. 12	Forty-third street, north 1 east of Broadway.....	Acker, Merrill & Condit, No. 135 West Forty-second street, city.....	$17 70
Jan. 20	Audubon avenue, east 1 north One Hundred and Seventy-third street.....	F T Kee, Audubon avenue and One Hundred and Seventy-third street, city.....	8 00
Jan. 20	One Hundred and Eighty-first street, north 1 east Fort Washington avenue..	J. C. Rodgers, No. 1909 Amsterdam avenue, city	17 70
Feb. 2	Third avenue, northwest corner Sixty-fifth street.....	Frank Coutey, No. 430 Montgomery street, Jersey City.....	13 20
Feb. 13	First avenue, southeast corner Seventy-ninth street..	Hencken & Willenbrock Company, Ninety-fourth street, East River, city.....	17 70
Feb. 19	Park avenue, southeast corner One Hundred and Twentieth street.....	Schwarzchild & Sulzherger, Forty-fifth street and East River, city.....	17 70

Date.	Location of Post.	Persons Responsible.	Amount Collected.
Feb. 23	Central Park West, northwest corner One Hundredth street	Geo. C. Flint Company, No. 45 West Twenty-third street, city	6 00
Feb. 28	Depew place and Forty-fifth street	O'Rourke Eng. Const. Company, No. 345 Fifth avenue, city	9 70
Mar. 13	Houston street, southwest corner Goerck street	Metropolitan Street Railway Company, No. 621 Broadway, city	13 20
Mar. 20	Avenue A, southeast corner Twenty-first street	R. H. Howes Company, No. 539 East Nineteenth street, city	13 20
May 3	Duane street, south 1 east of West Broadway	John Young, No. 142 Duane street, city	17 70
May 4	Trinity place, west 1 north Rector street	Thompson-Starrett Company, Rector street and Trinity place, city	9 70
May 6	McCombs road, east 1 north One Hundred and Fifty-third street	A. K. Bedell, No. 1985 Madison avenue, city.	13 20
May 5	One Hundred and Fortieth street, north 4 east Eighth avenue	O'Reilly Bros., St. Nicholas avenue and One Hundred and Twenty-third street, city	17 70
May 14	One Hundred and Twenty-third street, north side 2 east Amsterdam avenue	John Simmons Company, No. 110 Center street, city	17 70
May 25	Lexington avenue, northeast corner Thirty-ninth street, (F. A.)	Karl H. Schultz, No. 430 First avenue, city	17 70
June 22	One Hundred and Eighty-first street, south 1 east Northern avenue	J. C. Rodgers & Son, No. 1929 Amsterdam avenue, city	9 70
Aug. 16	Broadway, Central Park, 2 north One Hundred and Tenth street	Howe Trans. & Contg. Company, No. 519 East Nineteenth street, city	17 70
Aug. 20	Madison avenue, southeast corner Ninety-ninth street.	New York City Railway Company, No. 621 Broadway, city	17 70
Dec. 14	Bergen avenue, west 1 north Westchester avenue	A. Santini, No. 718 Westchester avenue, city.	17 70
Dec. 28	Broadway, east 1 north Two Hundred and Twenty-sixth street	Tarry & Trench Company, Two Hundred and Fifteenth street and Hudson River, city	17 70
		Total amount collected	$300 30

Department of Water Supply, Gas and Electricity,
Bureau of Lamps and Gas, Nos. 13 to 21 Park Row,
New York, January 1, 1908.

Mr. CHARLES F. LACOMBE, Chief Engineer of Light and Power:

Dear Sir—I submit herewith a general report of the lighting of public buildings under my charge for the year 1906.

The work of this year was largely devoted to the review and revision of plans submitted to this Bureau indicating the nature, number and distribution of lights proposed for installation therein by the various architects formulating said plans. Four Inspectors assisted in this work by inspecting such of the various public buildings as

were open at night, averaging three night inspections each week for each man, a total of eighteen hundred inspections made during this year. This resulted in many improvements being made in the public lighting, judged by both the standpoints of efficiency and economy. We succeeded as well in having the power and lighting lines, both gas and electricity, separated in these various buildings.

This action secured quite a saving to the City, and also improved the lighting services considerably.

Considerable saving was also effected by the extension of the gas regulator system throughout the public buildings, and over and above this saving the illumination in many of these structures was improved from 33⅓ to 50 per cent.

Another feature to which it is desired to draw attention has been the fact that this Bureau has caused many improvements to be made from time to time in the various public buildings by bringing to light numerous violations that have been found to exist in the electrical equipments of these buildings, and of which fact the Electrical Bureau was not aware. As these violations were discovered, the Electrical Bureau was informed and requested to make a detailed examination of the premises in which such defects existed and upon receipt of a report confirming same a copy was forwarded to the Department under whose jurisdiction the building was operated, with instructions that we would require their immediate removal or we would be compelled to discontinue current to the premises.

A summary of what has been done in each of the different departments during the year is presented in the following:

Armories.

While the number of buildings have not increased, some old armories have been destroyed and new ones erected in lieu of the same, while improvements have been made in others.

As stated in my report for the year 1904, we then had before us plans and specifications of two new armories of the Sixty-ninth and Seventy-first Regiments, respectively. These plans have since been reviewed and revised by this Bureau, the armories have been completed and put in operation with the following results:

In the Seventy-first Regiment we have been informed by a number of illuminating engineers that it is considered one of the best illuminated armories in the United States. In the case of the Sixty-ninth Regiment Armory a great improvement over the lighting of the former quarters of this regiment has taken place, still there are many changes to be desired, as judged from the standpoints of efficiency and economy. This appears due to the fact that the recommendations of this Bureau were not adhered to when the plans of this structure were revised. Members of the Armory Board, however, have since assured us that an error has been made and will endeavor in the near future to make the changes in the lighting as recommended by this Department. The improvements made in the old armories were the renovation of the colonel's room of the

Twenty-second Regiment and the installation of the mantle system of illumination in the drill hall of the Eighth Regiment Armory. It is understood that the Armory Board is now considering applying for sufficient funds to erect new armories for the Twenty-second Regiment, Second Battery and the Eighth Regiment. Renovations are now being made in the present quarters of the Eighth Regiment, to make same available for Squadron A, when the proposed new armory for the Eighth Regiment is in service.

Bellevue and Allied Hospitals.

During the past year many improvements have been accomplished in this Department, the new Harlem Hospital with ambulance station attached has been erected and put in operation. An annex to Nurses' Home of Bellevue Hospital has been completed and equipped with modern form of gas lighting under the direction of this Bureau; a new Gouverneur and a new Fordham Hospital have been completed and placed in operation, with modern forms of illumination, as recommended by this Department. These two new buildings have taken the place of the old structures which have been in use for many years past.

Plans have been submitted for Pavilions "A" and "B" of the New Bellevue Hospital, now in course of construction on the site of the present institution. This whole plant, when completed, will extend from Twenty-sixth to Twenty-ninth street, and from the east side of First avenue to the shore of the East River.

Plans of the two pavilions are the first of a series of plans which will eventually be submitted to this Bureau for review and approval.

Department of Charities.

Many marked improvements are now under way in the buildings of this Department, in fact, possibly greater than any other Department in the City. This is due to the fact that by the efforts of this Bureau and the constant agitation of the subject, the Department of Public Charities has realized the inefficiency of the method that has been employed by them for many years past in lighting their public buildings, most of which are situated on Blackwell's Island. As a result of our efforts, plans are being formulated and submitted to this office, upon which we indicate the nature, number and distribution of lights we recommend installing in the various structures on the island. This work is a large one, involving rewiring, and in many cases, repiping a total of about one hundred and fifty buildings, requiring an installation of about twenty thousand incandescent lamps. Many visits were made to the island in order to better judge the number and distribution of lights required and also to be certain that the equipment, when completed, will be not only efficient, but economical.

During the past year, this Department has submitted plans for a pavilion, knitting mill and shoe factory, respectively, on Hart's Island. These plans have been reviewed and revised by this Bureau, and the work is now under the course of installation.

Department of Correction.

The Second District Prison, commonly known as Jefferson Market Prison, is now being being equipped with the electric incandescent lighting under the supervision of this Bureau. This will effect a great improvement in this building, insuring greater comfort to the prisoners and affording superior facilities to the employees who care for and guard them.

Department of Education.

This Department, during the past year has made many changes in its equipment of buildings. This is due to the fact that by direction of the Mayor and by the authority extended by the Sinking Fund Commission, a large number of temporary quarters were rented for a short time and utilized for school purposes, being designated as "Annexes" to the existing public schools. This action was taken in order to provide as near as possible for each child of school age a full school day. Many of these buildings have since been abandoned as new schools or new additions to old schools were completed.

This is the only Department that has not submitted their plans to this office for review and approval. This is due to the fact that up to the present, you have not deemed it wise to take up this work until such time as better facilities are afforded it in the way of increased inspection. It is hoped the day is not far distant when we can pass upon and revise these plans, for it is known, not only from reports of Inspectors, but from personal observation, that great improvements could be made. From our standpoint these buildings are improperly lighted, the waste of gas and electric current being positively distressing.

Fire Department.

This Department has made considerable improvements during the past year in its general building equipment. Plans and specifications of fifteen buildings have been submitted to this Bureau, reviewed and revised. Many old structures have been completely renovated, while new ones have been erected. The improvements in the way of lighting suggested and urged by this Department in the year 1903 and agreed to by the Fire Department during that year are being installed in all new buildings, and also in these buildings now being renovated.

Much credit is due to this Department, when compared with other Departments in its economical use of electrical current or gas. Personal observation and the reports of our Inspectors show that this Department is more conscientious in the use of these two commodities than many others in the City.

Department of Health.

This Department has made much improvement in its general equipment and deserves credit for its cooperation with this Bureau in the lighting of its buildings. In fact no Department in the City to-day has furnished more aid through its cooperation than the Department of Health. The result has been that a modern and improved form of illumination is in operation in many of its buildings to-day, and particularly

those buildings that have been erected during the past year. During the year 1906, this Department either started or completed a total of twelve buildings, many of which were attached to the well-known Willard Parker Hospital in East Sixteenth street. This Department is constantly making improvements, and as constantly adding to its equipment; ample provision should always be made for it in our annual Budget.

Public Buildings and Offices.

This Department has increased its building equipment, but I regret to state that the conditions here, so far as cooperation with this Bureau is concerned, are not at all satisfactory. During the year many new buildings were either started or completed, prominent among these being a number of public baths. One of the most glaring cases of failure to cooperate with this Bureau, however, has been that of the County Court House. These premises were equipped with an electric incandescent lighting without plans or specifications being submitted for review or approval, with the result that we refused to supply electric current until a number of violations found to exist were removed and the building placed in a position secure from danger of fire. Over and above this we continued to refuse supplying electric current to these premises until such time as the Borough President through his then Superintendent of Public Buildings entered into an agreement with this Bureau, in writing, to make any and all changes we might deem necessary in the lighting installed in this structure by the first day of October, 1907. It is to be deeply regretted that the Borough President has failed in keeping this agreement. As a result, many of the buildings erected during the past year under his charge, to which this Department is now supplying gas and electric current contain defects that could have been avoided and are devoid of improvements that could have been made without extra cost.

Police Department.

This Department has also, during the past year, made improvements in its equipment, by completing the Thirty-sixth and Thirty-ninth Precinct Station Houses, located in the Borough of The Bronx. It has submitted plans for the new Police Headquarters, to be erected on the site of the present Centre Market. The plans of the Thirty-sixth and Thirty-ninth Precincts were not submitted through a mistake on the part of the Police Department until the buildings were practically completed, and we accordingly refused to supply electrical current to the same until the Police Department entered into an agreement with this Bureau to the effect that they would make any alteration we would require in the lighting installed. This agreement having been made, current was supplied, and in the course of the year the necessary changes accomplished. We have also induced the Police Department to maintain the mantle system of illumination installed under our supervision in the ten police stations selected by the Police Department during the year 1905. It is hoped to extend this system to the other station houses of this Department in time. This is an improvement very much to be desired. At the present time, many of these station houses are in a

wretched condition of illumination. This is particularly true of the cells of the prisons connected with the station houses. Instead of having one light in front of each cell so as to afford the Doorman the proper facilities to care for and guard the prisoners, a few gas brackets or pendants are indiscriminately located along the corridors, irrespective of their illuminating effect on the cells. The result is that the Doorman is in constant danger of attack on the part of his prisoners through the continual opening of the cell doors, while on the other hand, he is unable to care for the prisoner in case of attempted suicide or illness, due to sudden attacks of heart failure superinduced by alcoholism or other causes. The Commissioner of this Department has expressed a willingness to cooperate with us in every way, looking toward the improvement of existing defective conditions.

Water Supply, Gas and Electricity.

Plans and specifications were submitted to this Department by the Chief Engineer of Water Supply, for two high-pressure fire service pumping stations, which were reviewed and revised as we deemed best. We have continued to maintain an efficient form of mantle lighting in the pumping station located at No. 104 West Ninety-eighth street and Jerome avenue, respectively, and as a result of this form of illumination greater facilities are being afforded to the employees for the execution of their important work.

Department of Street Cleaning.

The lighting of this Department has been given the necessary atention. No new buildings have been erected and but slight changes have been made in its equipment. In fact, nothing further than a few additional lights and motors here and there were added to the equipment of the previous year. Such installations were made strictly under the supervision of this Department. Gas regulators have been installed and maintained under contract in such of the buildings of this Department where we deemed their installation necessary, and we have also had economical burners installed throughout the various buildings of this Department.

Tenement House Department.

During the year this Department submitted plans to this Bureau requesting that we formulate a system of lighting for the offices of this Department then located on fourth floor of the Mercantile Building, No. 44 East Twenty-third street. This was done to the satisfaction of the officials of the Department.

Department of Parks.

A number of small buildings have been added to the equipment of this Department, the more prominent among them being the Pergola and Pavilion respectively of DeWitt Clinton Park. This Department has not, and never did have, any large number of buildings of any great lighting significance, but equal attention to that given to the other Departments has been accorded it.

In General.

You will note in reviewing the report for the year 1904, that there were then in existence a total of seven hundred and eighty-five buildings. Our records for the year 1906 show an equipment of seven hundred and seventy-eight buildings, or a total of seven buildings less than that existing two years previous. This apparent deficiency is due to several causes. In reality, while the number of buildings has decreased, the general equipment, both gas and electric, in lights and appliances, has increased from

an approximate total of 219,532 lights in 1904 to 280,000 in 1906, or an increase of approximately 60,600 lights.

This was caused for reasons previously stated.

The apparent decrease is also due to the fact that the Department of Bellevue and Allied Hospitals in the erection of the new Fordham, Harlem and new Gouverneur hospitals concentrated the work of many small outlying buildings connected with these old hospitals under these titles in the new buildings.

The approximate total number of plans passed upon for new buildings or additions and improvements made to existing buildings was one hundred.

During the year, this Department induced the Civil Service Commission to call for another examination of Inspectors. The number of Inspectors assigned to the Public Buildings has never been sufficient to fully cope with the demands of the situation, and as a result many defects that might have been remedied still exist today and many improvements that might have been effected are still left unaccomplished. Up to November 1, 1906, there were but four Inspectors assigned to look after a total of approximately six hundred and sixty-one buildings in the Borough of Manhattan, while no Inspectors whatever were assigned to those situated in The Bronx, although all possible attention was given the borough.

In the Borough of Manhattan it is proper to say that efficient service cannot be assured from our men when we require each of them to supervise so many buildings. To maintain efficient inspection it is necessary that our Inspectors inspect each one of these buildings at night at least once a month.

The Bronx, as you know, is a rapidly growing borough and public buildings are rapidly increasing in number. We should, therefore, assign a sufficient number of men to cover this territory, both day and night.

In the face of these facts, I trust you will afford me the necessary assistance to properly execute the work entailed in the care of these public buildings by appointing a sufficient number of Inspectors to cover these two boroughs. In this connection, I would state that the various Departments are rapidly beginning to realize not only the necessity but the advisability of complying with the provisions of the Charter and the decisions of the Corporation Counsel in affording us their fullest co-operation in this important work. The heads of the various Departments and their Engineers are gradually coming to a realization of the fact that the supply of gas and electrict current of our public buildings for heat, power, and particularly lighting purposes, requires the special and undivided attention of a body of men qualified to handle these problems.

Following are five tables, A, B, C, D and E, respectively.

Tables A. B. C and D set forth the number of buildings, lights and appliances now under the supervision of this Bureau, together with the total number of lights for gas (C) and electricity (D) that have been installed during the past year, while Table E serves to illustrate the important and necessary work that has been accomplished by employing the services of the Gas Consumers' Association by contract.

Trusting that I have laid before you a comprehensive general statement of the transactions of this office for the year 1906,

I am,

Yours respectfully,

Chief Inspector of Public Buildings.

TABLE

The following table shows the number of buildings in Manhattan and The Bronx, together with the total number of gas lights and appliances in service December 31.

Name of Department.	Number of Buildings.	Open Flame Burners.	Mantle Burners.	Bunsen Burners.	Monitor Burners.	Arc Lamps.	Ranges.
Armories	11	7,701	1,786	3	6	.	6
Bellevue and Allied Hospitals	36	1,760	235	25	..		17
Bridges	6	69	20	..	..	.	..
Charities	95	7,026	114	5	..		37
Correction	18	1,400	26	12	..		6
Education	227	77,727	1,277	138	..	46	166
Fire	122	4,400	96	78	..		
Health	18	1,778	5	..			2
Parks	40	402	3	..	..		2
Police	56	3,763	1,083	..	.		
Public Buildings and Offices	63	6,396	1,475	..			6
Street Cleaning	59	1,273	3	..	.		..
Tenement House	1	.. .		..	.		..
Water Supply, Gas and Electricity	26	598	241	7	.	.	4
Total	778	114,293	6,364	268	6	46	246

TABLE

The following table shows the number of buildings in Manhattan and The Bronx, with the total number of electric lights and appliances in service December 31, 1906:

Name of Department.	No. of Buildings.	Incandescent Lamps.	Arc Lamps.	Motors.
Armories	11	9,067	386	23
Bellevue and Allied Hospitals	36	5,015	..	32
Bridges	6	62	6	6
Charities	95	2,624	2	5
Correction	18	3,501	21	..
Education	227	103,650	86	95

A.

under the Supervision of the Bureau of Lamps and Gas During the Year 1906, 1906:

Sterilizers.	Hot Plates.	Water Heaters.	Hose Cocks.	Stoves.	Pumps.	Engines.	Lead Furnaces.	Soldering Iron Furnaces.	Sad Iron Heaters.	Ironing Machines.	Incubators.	Radiators.	Clothes Dryers.
..	24	2	..	..	1	1	2	2	1	..	..	33	1
16	69	4	..	..	1	..	..	..	..	..	2	16	..
..	2	..	..	..	..	..	..	..	..	..	..	..	..
9	170	2	..	..	..	1	..	1	5	6	5	9	..
3	26	..	..	..	..	..	..	..	1	..	..	3	..
..	1,161	69	342	..	147	72	1	5	..	..	..	321	1
..	42	..	..	..	..	1	..	4	..	..	..	8	13
..	46	2	..	..	..	..	..	..	..	..	..	6	..
..	16	1	..	..	..	..	..	2	..	..	..	1	..
..	30	..	..	..	1	..	..	..	..	..	..	30	1
..	14	..	..	1	2	1	..	2	..	..	..	8	..
..	6	1	..	..	..	..	..	..	..	..	..	1	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..
1	14	1	..	..	..	..	..	..	..	..	..	5	..
29	1,620	82	342	1	152	76	3	16	7	6	7	441	16

B.

under the supervision of the Bureau of Lamps and Gas, during the year 1906, together

Fans.	Pumps.	Charging Rheostat.	Motor Generator.	Air Compressors.	Air Vacuum.	Electric Heaters.	Iron Heaters.	Electric Irons.
10	..	..	..	..	..	..	..	..
21	..	..	..	..	..	2	..	..
..	..	..	..	..	..	..	..	..
21	..	..	..	..	..	..	14	..
..	..	..	..	..	..	..	..	..
46	5	..	1	1	1	..	..	3

Name of Department.	No. of Buildings.	Incandescent Lamps.	Arc Lamps.	Motors.
Fire	122	2,323	5	11
Health	18	3,690	..	32
Parks	40	953	185	..
Police	56	1,577	1	15
Public Building and Offices	63	17,021	20	28
Street Cleaning	59	326	7	5
Tenement House	1	522	..	..
Water Supply, Gas and Electricity	26	74	2	..
Total	778	150,405	721	254

TABLE

The following table shows the number of buildings in Manhattan and The Bronx, together with the total number of gas lights and appliances installed during that year:

Name of Department	No. of Buildings.	Open Flame Burners.	Bunsen Burners.	Monitor Burners.	Arc Lamps.
Armories	11	1,484	3	6	
Bellevue and Allied Hospitals	36	502			
Bridges	6	41			
Charities	95	397	...		
Correction	18	66			
Education	227	9,417	1,533		
Fire	122	397	4		
Health	18	832			2
Parks	40				
Police	56	165	...	...	
Public Buildings and Offices	63	510		..	
Street Cleaning	59	72			
Tenement House	1				
Water Supply, Gas and Electricity	26	3	2		
Total	778	13,886	1,542	6	2

Fans.	Pumps.	Charging Rheostat.	Motor Generator.	Air Compressors.	Air Vacuum.	Electric Heaters.	Iron Heaters.	Electric Irons.
14	..	1	..	..	..	..	..	..
20		..	..	..	..	..	10	4
15	.	.	..	..	..	..	..	..
42	..	..	..	..	..	..	1	..
21	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
212	5	1	1	1	1	2	25	7

C.

under the supervision of the Bureau of Lamps and Gas, during the year 1906,

Ranges.	Sterilizers.	Hot Plates.	Water Heaters.	Hose Cocks.	Stoves.	Pumps.	Engines.
2							
8	5				50		
....							
3		6					
....							
49		278	17	46	137	30	26
....			1				
...					13		
.							
							
	. .				2		
							
							
1					5		
63	5	284	18	46	207	30	26

TABLE

The following table shows the number of buildings in Manhattan and The Bronx, with the total number of electric lights and appliances installed during that year:

Name of Department.	Number of Buildings.	16 C. P. Incandescent.	20 C. P. Incandescent.	32 C. P. Incandescent.
Armories	11	4,401		
Bellevue and Allied Hospitals	36	23		
Bridges	6			
Charities	95	7		
Correction	18	177		
Education	227	31,627		
Fire	122	422		
Health	18	958		
Parks	40	172		
Police	56	549		
Public Buildings and Offices	63	917	719	
Street Cleaning	59			
Tenement House	1			
Water Supply, Gas and Electricity	26			
Total	778	39,253	719	20

D.

under the supervision of the Bureau of Lamps and Gas, during the year 1906, together

Arc Lamps.	Motors.	Fans.	Pumps.	Charging Rheostats.	Motor Generator.	Air Compressor.	Air Vacuum.
216	6	..	..	..	..	..	..
..	7	..	..	..	..	..	..
.	..	..	..	..	..	..	..
5	1	..	..	..	..	..	..
4	..	..	..	..	..	..	..
6	35	..	6	..	1	1	1
..	2	..	..	3	..	..	..
	6	..	..	..	..	..	..
13	..	..	..	..	..	..	..
	..	..	..	..	..	..	..
2	17	11	..	..	..	..	..
	2	..	..	..	..	..	..
	..	..	..	..	..	..	..
	..	..	..	..	..	..	..
246	76	11	6	3	1	1	1

TABLE E.

Table Showing Number of Gas Regulators in Commission on Public Buildings Under Contract With Gas Consumers' Association in the Boroughs of Manhattan and The Bronx for the Year 1906 and Memorandum of Work Done and Merchandise Furnished by Them.

January 1, 1906—		
Number of gas regulators on rental		347
New installations during year	218	
Discontinued	12	
		206
In commission December 31, 1906		533
Number of inspections		5,400
Number of defects found and remedied by the Gas Consumers' Association		247
Number of complaints sent by Department of Water Supply, Gas and Electricity and attended to by the Gas Consumers' Association		185
Number of places where stoppages in pipes were pumped or cut out		151
Number of regulators changed		19
Number of new burners put on		9,280
Number of Bristol record pressure gauge tests		11
Average monthly amount of gas being passed by regulators, cubic feet		14,635
Average monthly amount of saving being effected by regulators, 18 per cent., cubic feet		3,312
Average monthly consumption without regulators would have been, cubic feet		17,847
Average monthly saving being effected by the regulators, 3,212 cubic feet, 75 cents per thousand		$2,409 00
Average monthly rental cost of regulators, 553 at $1.23 each		680 00
Average monthly net saving being effected		$1,729 00
Per annum, about		$20,000 00

Maintenance.

January 1, 1906—	
Number of gas regulators owned by the City on public buildings, but maintained under contract with Gas Consumers' Association in the Boroughs of Manhattan and The Bronx	24
Discontinued during the year	1
In commission December 31, 1906	23
Number of inspections	279
Number of complaints found and remedied by the Gas Consumers' Association	5
Number of complaints sent by Department of Water Supply, Gas and Electricty and attended to by the Gas Consumers' Association	3
Number of complaints requiring pumping or cutting out	4
Number of new burners put on	53
Average monthly cost of maintenance per regulator	$1 40

Bids for Gas and Naphtha Street Lighting and

Company.	Open Flame Gas Lamps, 3-foot Burners.		Mantle Gas Lamps, 60 C. P.	
	Supply of Gas, etc.	Maintenance of Lamps.	Supply of Gas, etc.	Maintenance of Lamps.
Manhattan—				
Consolidated Gas Company:				
Per month		*$0 50		†$1 00
Per annum		6 00		12 00
New Amsterdam Gas Company:				
Per month		1 00		
Per annum		(12 00)		
Standard Gas Light Company:		12 00		
Per month		1 0733		
Per annum		(12 7989)		
		12 88		
Welsbach Street Lighting Company of America:				
Per month				
Per annum				
New York and New Jersey Globe Gas Light Company:				
Per month				
Per annum				
Cleveland Vanor Light Company:				
Per month				
Per annum				
The Bronx—				
Consolidated Gas Lighting Company:				
Per month		50		1 00
Per annum		6 00		12 00
Welsbach Street Lighting Company of America:				
Per month				
Per annum				
New York and New Jersey Globe Gas Light Company:				
Per month				
Per annum				
American Street Lighting Company of Delaware:				
Per month				
Per annum				

Gas for Public Buildings, February 1, 1906.

Open Flame Naphtha Lamps.		Mantle Naphtha Lamps, 60 C. P.		Erection of New Lamp-posts.	Buildings Per 1,000 Cubic Feet.	Remarks.
City to Furnish Posts.	Contractor to Furnish Posts.	City to Furnish Posts.	Contractor to Furnish Posts.			
.....						* 258 lamps or more. † 16,747 lamps or more.
.....				$8 00		
.....						This bid includes supply of gas, along the lines
.....						of the mains of this company.
.....				10 00		
.....						This bid includes supply of gas, along the lines
.....						of the mains of this company.
.....				10 00		
.....		$2 27	$2 27			Not less than 100 lamps; as at present located or as may be directed.
.....			(28 50)			
.....		27 24	27 24			
$1 74	$1 74					Not less than 107 lamps; as at present located or as may be directed.
.....	(21 80)					
20 88	20 88					
*1 8166		†2 25				† 800 or more. * 100 or more; as at present located or as may be directed.
21 80		27 00				
.....						* 95 lamps or more. † 6,013 lamps or more.
.....				8 00		
.....		2 27	2 27			Not less than 470 lamps; as at present located or as may be directed.
.....			(28 50)			
.....		27 24	27 24			
1 74	1 74					Not less than 1,200 lamps; as at present located or as may be directed.
.....	(21 80)					
20 88	20 88					
*1 71		†2 14				*1,238 lamps. † 474 lamps.
20 52		25 68				

Company.	Open Flame Gas Lamps, 3-foot Burners.		Mantle Gas Lamps, 60 C. P.	
	Supply of Gas, etc.	Maintenance of Lamps.	Supply of Gas, etc.	Maintenance of Lamps.
Brooklyn—				
Brooklyn Borough Gas Company:				
Per month		6 00		17 00
Per annum				
New York and New Jersey Globe Gas Light Company:				
Per month				*1 16
Per annum				
				13 92
Per month				1 11
Per annum				13 32
Per month				1 05
Per annum				12 60
Welsbach Street Lighting Company of America:				
Per month				
Per annum				
				
Queens—				
New York and Queens County Gas Company:				
Per month		1 10		1 10
Per annum		13 20		13 20
New York and New Jersey Globe Gas Light Company:				
Per month				
Per annum				
Welsbach Street Lighting Company of America:				
Per month				
Per annum				
				

Open Flame Naphtha Lamps.		Mantle Naphtha Lamps, 60 C. P.		Erection of New Lamp-posts.	Buildings Per 1,000 Cubic Feet.	Remarks
City to Furnish Posts.	Contractor to Furnish Posts.	City to Furnish Posts.	Contractor to Furnish Posts.			
.....						31st Ward, Borough of Brooklyn. Bid also on repairs to lamp-posts.
.....						Bid informal; no securities.
†1 74	†1 74					*Not less than 5,900 lamps, as ordered. †Not less than 12 lamps.
.....	(21 80)					
20 88	20 88					On Barren Island, or as ordered.
.....						Not less than 10,000 lamps.
.....						
.....						Not less than 15,000 lamps.
.....						
.....		2 27	2 27			Not less than 480 lamps; as at present located or as ordered.
.....			(29 00)			
.....		27 24	27 24			
.....						Bid also on repairs to lamp-posts, including lease of service and stand pipes at 12½c. per lamp per month, 3d Ward, Borough of Queens, on line of mains of company.
.....						Bid also on repairs to lamp-posts, including lease of service and stand pipes at 12½c. per lamp per month, 3d Ward, Borough of Queens, on line of mains of company.
1 98	1 98					Not less than 100 lamps; located as directed.
23 76	23 76					
.....		2 27	2 27			Not less than 100 lamps; located as directed.
.....			(29 00)			
.....		27 24	27 24			

Note—Figures in parentheses are prices bid for 1905.

Bids for Repairs Sub

Company.	Lamp-posts Straightened.	Column Releaded.	Column Recaulked.	Column Refitted.	Service Pipe Refitted.
Manhattan—					
Consolidated Gas Company...	$1 50	$2 50	$1 00	$3 50	$5 50
	(1 50)	(2 50)	(1 00)	(3 50)	(5 50)
New Amsterdam Gas Company.	1 50	1 50	1 00	3 50	4 00
	(1 50)	(1 50)	(1 00)	(3 50)*	(4 00)
Manhattan—					
Standard Gas Light Company..	1 50	2 50	1 00	3 50	5 50
	(1 50)	(1 50)	(90)	(3 50)	(5 50)
The Bronx—					
Central Union Gas Company..	1 50	2 50	1 25	3 50	5 50
	(1 50)	(2 25)	(1 25)	(3 00)	(3 50)
Northern Union Gas Company.	1 50	2 50	1 50	3 50	5 50
	(1 50)	(2 50)	(1 50)	(3 00)	(3 50)
Brooklyn—					
Brooklyn Union Gas Company.	1 50	1 50	1 50	3 50	4 00
	(1 50)	(1 50)	(1 50)	(3 50)	(4 00)
Queens—					
Newtown Gas Company.....	1 50	1 50	1 50	3 50	4 00
	*....	*....	*....	*....	*....
Jamaica Gas Light Company...	1 50	1 50	1 50	3 50	4 00
	*....	*....	*....	*....	*....
Richmond Hill and Queens County Gas Light Company	1 50	1 50	1 50	3 50	4 00
	*....	*....	*....	*....	*....

*No bids.

Note—Figures in parenthesis are bids for 1905-1906.

mitted May 29, 1906.

Standpipe Refitted.	Lamp-post Removed.	Lamp-post Reset.	New Lamp Fitted Up.	Lamp-post Painted.	Remarks.
$2 50	$3 50	$8 00	$8 00	$0 20 per coat.	
(2 50)	(3 50)	(8 00)	(8 00)	(No bid.)	
4 00	3 50	10 00	10 00	No bid.	
(4 00)	(3 50)	(10 00)	(10 00)	(No bid.)	
2 50	4 50	10 00	10 00	No bid.	
(2 50)	(4 50)	(10 00)	(10 00)	(No bid.)	
2 50	3 50	8 00	8 00	$0 25	Twenty-third Ward.
(2 00)	(3 50)	(8 00)	(8 00)	(No bid.)	
2 50	3 50	8 00	8 00	$0 25	Twenty-fourth Ward, except the late Town of Kingsbridge.
(2 00)	(3 50)	(8 00)	(8 00)	(No bid.)	
4 00	3 50	10 00	10 00	$0 20	Except the Thirtieth and Thirty-first Wards.
(4 00)	(3 50)	(10 00)	(10 00)	(No bid.)	
4 00	3 50	10 00	10 00	$0 20	Second Ward.
*....	*....	*....	*....	*....	
4 00	3 50	10 00	10 00	$0 20	Fourth Ward.
*....	*....	*....	*....	*....	
4 00	3 50	10 00	10 00	$0 20	Fourth Ward.
*....	*....	*....	*....	*....	

IX.

BUREAU OF ELECTRICITY.

BOROUGHS OF MANHATTAN AND THE BRONX.

Department of Water Supply, Gas and Electricity,
Bureau of Electricity,
New York, August 12, 1907.

Hon. JOHN H. O'BRIEN, Commissioner:

Sir—In accordance with your instructions, I have the honor to submit herewith report of the operations of the Electrical Bureau for Manhattan and The Bronx for the year 1906.

High-Tension Electric Service.

During 1906 there were constructed 433.138 miles of subways for high-tension electric service.

The following is a summary of high-tension subway construction in the Borough of Manhattan, from the introduction of the subway system in 1886 to December 31, 1906:

	Subways Built, Miles.
1886-1897—Under direction of the Board of Electrical Control	738.992
1898-1901—Under direction of the Department of Public Buildings, Lighting and Supplies	565.658
1902-1906—Under direction of the Department of Water Supply, Gas and Electricity	1,094.613
Total to December 31, 1906	2,399.263

Average Yearly Construction—	Subways, Miles
Twelve years, 1886-1897	61.583
Four years, 1898-1901	141.415
Five years, 1902-1906	218.922

Low-Tension Electric Service.

The length of low-tension subways built in 1906 is 561.884 miles.

The following is a summary of construction for low-tension electric service since the introduction of the subway system in Manhattan and The Bronx in 1886 to December 31, 1906:

	Subways Built, Miles.
1886-1897—Under direction of the Board of Electrical Control	1,278.960
1898-1901—Under direction of Department of Public Buildings, Lighting and Supplies	482.474
1902-1906—Under direction of Department of Water Supply, Gas and Electricity	1,324.140
Total to December 31, 1906	3,085.583

Average Yearly Construction—	Miles.
Twelve years under the Board of Electrical Control	106.581
Four years under Department of Public Buildings, Lighting and Supplies	120.618
Five years under Department of Water Supply, Gas and Electricity	264.828

The figures given in the foregoing part of this report on the subject of new construction are summaries for three separate periods, when the work was successively under the direction of the Board of Electrical Control, the Department of Public Buildings, Lighting and Supplies, and the present Department of Water Supply, Gas and Electricity. The subjoined tables give the details, including both high and low-tension electric service.

Aerial Wiring.

Our inspectors are continually discovering wires strung across the streets by private concerns, which are not in possession of a franchise authorizing them to use the streets, and, consequently, without the permit of this Department to install the same. It has, therefore, been necessary for this Bureau to keep an inspector and laborer constantly at work, searching for and removing these conductors, and during the past year, the number of these wires, together with abandoned wires, removed by our inspectors, without additional expense to the City, was approximately 182,900 feet or 34.64 miles.

The various companies operating electrical conductors in the Boroughs of Manhattan and The Bronx have reported the removal of poles and wires as per the following table:

	Poles.	Wires.
Western Union Telegraph Company	128	157.5
Stock Quotation Telegraph Company	..	6.5
New York Edison Company	..	20.
New York Telephone Company	..	1,826.
Automatic Fire Alarm Company	..	.75
Holmes' Electric Protective Company	..	19.04
Manhattan Fire Alarm Company	..	1.5
Postal Telegraph-Cable Company	..	4.
American District Telegraph Company	..	5.5
Special Fire Alarm Electrical Signal Company	..	4.5
Westchester Lighting Company	9	.359
	137	2,047.649
—together with those removed by our Inspectors	..	34.64
	137	2,082.289

TABLE IV.

Permits issued for the construction of subways and subsidiaries since the organization of this Bureau in 1898:

Permits	1898.	1899.	1900	1901.	1902.	1903.	1904.	1905.	1906.
Subway	140	350	320	391	723	953	973	1,493	1,481
Subsidiary	973	2,950	3,010	2,789	3,861	4,071	4,172	5,185	8,761
Total.....	1,113	3,300	3,330	3,180	4,584	5,024	5,145	6,678	10,242

TABLE V.

Permits issued in 1906 for erection of poles and stringing overhead and underground electrical conductors:

For signal wires	5,102
For electric lighting	6,076
For pole lines	644
For resetting dangerous poles	196
For City lighting and lamp-posts	419
Underground conductors	6,140
Total	18,577

The following table gives a summary of the permits issued for aerial conductors from 1898 to December 31, 1906:

TABLE VI.

Exterior Wiring.

Permits Issued.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Signal wires	1,485	2,124	2,600	2,416	2,059	2,756	2,772	3,751	5,102
Electric Lighting	1,083	1,340	989	983	1,150	2,772	2,355	4,132	6,076
Poles and pole lines...	38	93	126	126	224	270	233	319	644
Resetting poles	45	12	30	61	25	38	385	197	196
Electric lamp-posts ...	22	38	15	9	61	136	286	252	419
Subsidiaries	975	2,950	3,010	2,789	3,874	4,106	4,172	5,185	8,761
Subways	140	350	320	391	723	953	973	1,493	1,481
Underground conductors			3,202	2,027	3,590	3,021	3,890	5,713	6,140
	3,788	6,907	10,292	8,802	11,706	14,052	15,066	21,042	28,819
Inspections made		9,325	14,522	13,020	14,738	16,015	18,806	21,395	25,682

TABLE VII.

Applications, Inspections and Certificates for Interior Wiring, 1898-1906.

	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Applications for inspection	11,363	14,949	15,693	15 903	18.443	21,113	21,722	27,509	36,465
Certificates issued	10,842	13,509	14,352	14,226	16,736	20,501	20,692	24,912	32,923
Complaint notices issued	1,564	2,136	3,238	3.396	3.078	5,674	5,703	5,377	5,343
Complaint notices attended to	1,459	1,779	3,095	3,337	2,832	6,122	5,760	5,151	5,499
Work Covered by Certificates—									
Incandescent lamps.	394,715	115,625	504,365	440,662	424,232	443,914	604,061	716,157	730,030
Arc lamps	3,840	3,887	6,411	3,123	4,030	7,226	7,662	5,560	9,701
Motors	3,234	4,663	4,743	5,147	5,933	7.393	9,962	11,013	12,292
Horse - power of motors	14,999	17,934	17,135	15,302	20,328	25,003	29,553	28,835	35,387
Generators	131	94	115	160	166	246	284	231	256
Kilowatt capacity of generators	7,587	11,912	5,475	8,249	60,516	30,654	66,988	50,794	30,211
Electric heaters							170	314	173
Inspections made	27,367	41,240	50,663	48,832	58,015	70,965	79.939	80,134	118,794

The above shows that certificates issued by this Department covering electrical equipments installed in buildings for 1,969,644 sixteen candle-power lamp equivalents were found to comply with the rules and regulations of this Department. We have 4,823 applications on hand, for which we were unable to issue certificates, the work being in an unfinished condition.

The following is a summary of the number of certificates, complaint notices and permits issued by the Electrical Bureau for the Boroughs of Manhattan and The Bronx, from 1898 to 1906, inclusive:

TABLE VIII.

	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Total certificates issued	10,842	13,509	14,352	14,226	16,736	19,702	19,718	24,912	33,965
Total complaint notices issued	1,564	2,136	3,238	3,396	3,978	5,674	5,703	5,377	5,343
Total permits issued	3,788	6,907	10,292	8,802	11,706	14,052	15,066	21,042	28,819
Grand total	16,194	22,552	27,882	26,424	32,420	39.428	40,487	51,331	68,127

The following table gives the number of inspections of exterior and interior wiring, from 1899 to and including 1906:

TABLE IX.

	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Exterior wiring.....	9,325	14,522	13,020	14,738	16,015	18,806	21,395	25,682
Interior wiring	41,240	50,663	48,832	58,015	70,965	79,939	80,134	93,112
Total.....	50,565	65,185	61,852	72,753	86,980	98,745	101,529	118,794

The Electrical System of the New York Central and Hudson River Railroad Company Within the Limits of New York City.

During the past year the New York Central and Hudson River Railroad Company installed an electrical system for the operation of their trains in New York City, and the following is a description of their apparatus and appliances:

Power House—The Port Morris power house, including the boiler rooms, coal bunkers and the generating rooms, is 167 feet wide, 237 feet long and 105 feet high. The switch house is a separate building and is located about 40 feet from the power house.

Power House Equipment—The power house is designed to accommodate a battery of twenty-four Babcock & Wilcox water tube boilers, rated at 625 horsepower each. Sixteen are installed for initial operation, making a present boiler capacity of 10,000 horsepower.

The condensers are of the counter-current surface type and each is directly connected to its turbine base and contains about 17,000 square feet of cooling surface.

The coal handling machinery has a capacity of 80 tons per hour and the ash handling capacity is 25 tons per hour.

In the turbine room is installed a 50-ton traveling crane with auxiliary 10-ton hoist.

Provision is made to accommodate six 5,000 kilowatt turbo-generators, four of which are installed for initial operation. The turbines are of the Curtis five-stage vertical type. These machines are about 15 feet in diameter at the base and 30 feet high from the floor to the top of the generator.

The four generators each have a capacity of 5,000 kilowatts, making a total of 20,000 kilowatts for initial operation and are wound for three-phase current of 25 cycles and 11,000 volts. The leads of the generators are brought down to the floor through brass pipes to the ducts leading to the high-tension switches in the switch house, the arrangement being such that no high-tension conductors are exposed in the turbine room.

The exciter system consists of two 150 kilowatt turbo-generators and one 150 kilowatt induction motor-generator, furnishing current at 125 volts pressure; also one exciter storage battery consisting of seventy-four cells, having a capacity of 1,200 amperes for one hour.

The station is operated from the operating gallery on the north side of the turbine room. The arrangement of the switchboards in this gallery is symmetrical, and all cables and copper connections running to the switchboard are carried in concrete trenches under an Alberene stone floor. The main operating switchboard containing all the control switches and the instruments necessary for the operation of the station, is located in the centre of the operating gallery.

The switch house is 50 feet 10 inches wide by 100 feet long. In the switch house is installed the high-tension switching equipment, consisting of bus bars, oil switches, instruments, transformers, etc.

Transmission Lines—The transmission lines are partly overhead and partly underground. The system is designed to give the greatest protection against interruptions of all kinds. Each substation may be fed from either power station, and the lines are so disposed that no ordinary accident could cut off a substation from its supply.

All overhead transmission lines are supported by lattice steel poles set in concrete foundations and spaced about 150 feet.

There are 6.2 miles of territory of overhead transmission lines consisting of No. 0000 bare stranded high tension cables, 1,000,000 c. m. bare stranded low-tension feeders and rubber covered remote control cable. The aggregate length of overhead conductors is 48.5 miles.

The remainder of the transmission lines are in ducts underground or in steel pipes on walls. There are 12.24 miles of territory of underground construction, making an aggregate of 87.26 miles of underground cable.

Where the high tension cables change from underground to aerial a cable terminal tower is provided which is equipped with substantial lightning arrester equipment.

Substations—There are four substations within the City limits of New York, Substations Nos. 1, 2, 3 and 7, located at Fiftieth street and Lexington avenue, Mott Haven Junction, Kings Bridge and Bronx Park, respectively. At the substations, the high tension current of 11,000 volts is stepped down to direct current at 666 volts for delivery to the third rail.

Substation Equipment—The main equipment in each substation consists of three rotary converters and their accompanying transformers and subsidiary apparatus. For initial operation, the substations are equipped with the following:

Substation No. 1—Three 1,500 kilowatts rotary converters receiving alternating current at 460 volts and converting it to direct current at 666 volts; nine 550 "air cooled" type transformers with a normal ratio of 11,000 volts to 460 volts for power;

six 120 kilowatts air cooled transformers for boosters; storage battery of 4,020 amperes for one hour rating; two boosters.

Substation No. 2—Has the same equipment as No. 1, except that the storage battery has a rating of 3,750 amperes for one hour.

Substation No. 3—Three 1,000 kilowatts rotary converters; nine 375 kilowatts air cooled transformers for power; six 120 killowatts air cooled transformers for boosters; storage battery of 3,000 amperes for one hour rating.

Substation No. 7—Has the same equipment as No. 3, except that the storage battery has a capacity of 2,250 amperes for one hour rating.

The high tension lines enter the substations either underground or overhead, are brought to oil switches which are electrically operated and are designed to carry a substantial overload.

There are two controlling boards in each substation, one a bench board which carries the principal instruments and control apparatus and the other an upright board carrying the auxiliary control apparatus for remote control, lighting, etc.

The direct current switchboards are equipped with motor-operated switches and circuit breakers which are controlled from the bench board. The positive feeders leaving these switchboards supply the third rail with current at 666 volts.

Each substation is supplied with all necessary subsidiary apparatus, such as a traveling crane which can be operated electrically or by hand, also lighting transformers, etc.

Circuit Breaker Houses—The four third rails and auxiliary feeders are joined together through circuit breakers installed in small houses at intervals along the line, thereby increasing the effective conductivity. There are nine circuit breaker houses installed for initial operation.

Equipment—For the initial operation there are thirty-five electric locomotives which were built by the American Locomotive Works. The electric locomotives are of the multiple unit, type M control. Each is equipped with four 550 horsepower No. 84 direct connected General Electric Company's motors. The weight of one motor is about 11,450 pounds, and the total weight of one electric locomotive complete is 199,000 pounds.

There are 63 multiple unit, type M control motor cars, now being put in service. Each motor car is equipped with two 200 horsepower No. 69-C General Electric Company's motors; the gear ratio is 26 to 49. The bodies of the cars were built by the American Car and Foundry Company, at Berwick, Pennsylvania. They are rigid steel construction throughout, 60 feet long and have a seating capacity of sixty-four passengers. The trucks were built by the American Locomotive Works.

The electric locomotives and motor cars are equipped with Westinghouse air brakes.

Up to the present date the electric service is as follows:

From Grand Central Station to High Bridge, Hudson Division, there are forty trains daily consisting either of three or four multiple unit cars. There are also in daily service ten trains, each propelled by an electric locomotive.

From Grand Central Station to Wakefield, Harlem Division, there are thirty trains daily, consisting either of three or four multiple unit cars.

While the New York, New Haven and Hartford Railroad are contemplating using electricity to operate their train service, they have not proceeded with the installation of electrical apparatus within the City limits, but are engaged in the construction of an overhead 11,000 volt single phase trolley system north of the City line.

Respectfully yours,

FRANK E. BROWN. Electrical Engineer.

TABLE I.

Showing Length of Subways and Ducts Constructed in 1906, with Classification of Service.

	For Edison Electric Light Company.		For Electric Light and Power Companies.		For Telephone and Telegraph Companies.	
	Trench.	Duct.	Trench.	Duct.	Trench.	Duct.
Feet	10,623.78	6,693.00	322,836.35	2,286,968.70	91,196.160	2,966,747.520
Miles	1.268	2.012	61.143	433.138	17.272	561.884

TABLE II.

Total Construction of Subways in Manhattan and The Bronx, from Introduction of System in 1886, to December 31, 1906.

	Miles.
Edison, low tension	279.328
Electric light, high tension	2,399.263
Telephone and telegraph	2,781.228
Ventilating pipe	60.110
Grand total	5,519.929

TABLE

The total construction is shown in the following tables in detail, giving class of

Year.	Edison.	
	Feet.	Miles.
1886		
1887	209,011.64	39.585
1888	22,227.88	4.210
1889	57,327.24	10.858
1890	248,973.54	47.155
1891	180,303.14	34.148
1892	166,034.00	31.445
1893	92,577.40	17.534
1894	38,250.47	7.244
1895	59,332.14	11.237
1896	41,247.79	7.812
1897	62,890.57	11.913
1898	73,732.44	13.96
1899	52,252.69	9.896
1900	48,317.80	9.151
1901	9,262.38	1.754
1902	16,357.26	3.093
1903	44,094.40	8.730
1904	42,240.00	6.899
1905	4,213.440	0.798
1906	10,623.78	2.012
	1,479,178.480	279.434

III.

service, linear feet and total mileage by years, as follows:

Electric Light.		Telephone and Telegraph.		Ventilating Pipe.	
Feet.	Miles.	Feet.	Miles.	Feet.	Miles.
.....		235,644.16	44.629		
238,428.65	45.157	958,264.69	181.489		
183,353.13	34.726	136,970.37	215.336		
1,929,962.97	365.523	344,985.58	65.338	77,752.28	14.725
438,902.05	83.125	944,567.32	178.895	59,187.68	11.210
274,411.20	51.972	236,835.94	44.855	30,314.65	5.741
129,852.00	24.593	70,760.82	13.401	8,033.50	1.520
156,646.10	29.667	574,982.07	108.898	73,776.24	13.973
107,427.90	20.346	119,662.70	22.662	8,845.40	1.675
95,781.40	18.140	246,193.39	46.627	16,943.76	3.209
183,788.50	34.808	152,807.85	28.941	25,598.55	4.847
163,334.75	30.935	166,940.13	31.618	4,753.63	.900
120,119.67	22.731	436,548.00	82.68	12,197.00	2.31
518,728.30	98.244	261,353.20	49.499		
261,509.30	49.528	899,944.320	170.444		
2,086,417.20	395.155	161,493.83	219.979		
620,034.58	117.431	184,909.70	224.415		
868,584.87	164.504	749,575.20	285.946		
799,625.77	151.444	202,303.61	45.162		
1,204,349.60	228.097	837,038.400	158.530		
2,286,968.70	433.138	2,966,747.520	561.884		
12,668,126.64	2,399.264	14,888,128.800	2,781.228	317,402.69	60.110

Statement Showing Expenditures During 1906 Chargeable to Appropriations of 1905; Appropriations of 1906; Expenditures During 1906; Balances on December 31 of Appropriations of 1906. Also Titles of Trust and Special Accounts; Balances on December 31, 1905; Credits During 1906 and Balances on December 31, 1906.

Titles of Appropriations.	Expenditures Chargeable to Appropriation, 1905.	Appropriations with Transfers, 1906.	Expenditures During 1906.	Balance of Appropriation December 31, 1906.
Boroughs of Manhattan and The Bronx.				
Salaries—				
General Administration	$551 43	$40,544 23	$40,544 23	
Central Office	4 11	29,934 69	29,887 02	$47 67
Water Register	55 50	136,858 27	136,677 07	181 20
Chief Engineer		12,179 92	12,179 92	
Croton Water System		33,037 00	32,921 94	115 06
Bronx River Works, Maintenance and Repairs		4,500 00	4,500 00	
Lighting and Electricity	19 50	89,517 06	88,701 42	815 64
Office of Deputy Commissioner and Water Register, Borough of The Bronx	64 03	42,529 35	42,320 70	208 65
Office of Chief Gas Examiner		13,513 13	13,513 13	
Maintenance, Croton Water System	122,373 64	396,554 50	346,203 73	50,350 77
Bronx River Works, Maintenance and Repairs	3,733 41	32,960 00	29,392 33	3,567 67
Supplies and Contingencies	3,033 76	23,000 00	21,443 44	1,556 56
Public Drinking Hydrants	397 62	3,000 00	2,325 28	674 72
Repairing and Renewal of Pipes, Stopcocks, etc	15,062 31	367,010 00	342,145 72	24,864 28
Water Supply for the Twenty-fourth Ward		1,000 00		1,000 00
Lamps and Lighting	9,243 81	1,565,834 58	898,797 00	667,037 58
Laboratory for Testing Electric Meters		1,500 00	375 00	1,125 00
Heat and Power for City Departments, County Buildings and Offices		29,852 82	15,897 86	13,954 96
Borough of Brooklyn.				
Salaries—				
Deputy Commissioner		11,000 00	11,000 00	
Water Register		53,000 00	52,795 99	204 01
Laboratory		9,800 00	9,576 16	223 84
Lighting and Electricity	44 77	43,910 00	43,404 02	505 98
High Pressure Fire Service Stations		9,023 75	8,635 90	387 85
Supplies and Contingencies	1,952 00	8,000 00	5,916 56	2,083 44
Rentals of Fire Hydrants	7,007 50	27,400 00	19,200 00	8,200 00
Lamps and Lighting	229,767 18	1,086,000 00	513,009 87	572,990 13
Heat and Power for City Departments, County Buildings and Offices		9,707 65	7,535 42	2,172 23

Titles of Appropriations.	Expenditures Chargeable to Appropriation, 1905.	Appropriations with Transfers, 1906.	Expenditures During 1906.	Balance of Appropriation December 31, 1906.
Borough of Queens.				
Salaries—				
Office of Deputy Commissioner....		19,837 17	19,823 34	13 33
Pumping Stations.....	37 50	38,655 93	38,642 10	13 83
Lighting and Electricity.....		14,212 00	14,207 17	4 83
Supplies and Contingencies.....	1,043 25	2,500 00	2,421 82	78 18
Maintenance and Repairs of Water Pipes, etc.....	1,863 17	31,095 00	30,655 86	439 14
Pumping Stations, Fuel and Supplies...	6,029 72	33,500 00	24,296 42	9,203 58
Rentals of Fire Hydrants.....	25,203 85	53,000 00	25,832 95	27,167 05
Supplying Water to Long Island City..	9,166 83	125,000 00	118,199 33	6,800 67
Lamps and Lighting.....	201,963 39	329,000 00	186,661 93	142,338 07
Heat and Power for City Departments..		500 00	453 58	46 42
Borough of Richmond.				
Salaries—				
Office of Deputy Commissioner....		6,049 92	6,049 92	
Lighting and Electricity.....	30 63	4,469 00	3,699 96	769 04
Supplies and Contingencies.....	10 50	1,000 00	939 72	60 28
Pumping Stations, Salaries and Supplies	1,312 35	13,000 00	10,745 01	2,254 99
Rentals of Fire Hydrants.....	28,820 88	30,052 50	14,597 50	15,455 00
Lamps and Lighting.....	157,786 70	157,900 00	78,869 98	79,030 02
Total.....	$826,579 34	$4,940,938 47	$3,304,996 80	$1,635,941 67

Note—Expenditures were also made during the year chargeable to Appropriations of 1904 to the amount of $479,159.45; of 1903 to the amount of $93,902.98; of 1902 to the amount of $45,441.73, and of 1901 to the amount of $435.

Titles of Trust and Special Accounts.	Balances December 31, 1905.	Credits During 1906.	Expenditures During 1906.	Balances on December 31, 1906.
Additional Water Fund of The City of New York.....	$37,067 77		$34,312 04	$2,755 73
Water Main Fund No. 3.....	17,164 41	$1,635 27	4,384 83	14,414 85
Water Fund, Boroughs of Manhattan and The Bronx.....	1,322,876 72	2,195,119 32	1,544,718 30	1,973,277 74
Water Meter Fund No. 2.....	19,428 09	100,160 70	119,373 05	215 74
Construction of High Pressure Fire Service, Borough of Manhattan	3,874,617 41	13,601 11	1,148,669 38	2,739,549 14

Titles of Trust and Special Accounts.	Balances December 31, 1905.	Credits During 1906.	Expenditures During 1906.	Balances on December 31, 1906.
Laying Mains in Southern Boulevard, near One Hundred and Forty-first Street	16,011 07	56 35	11,792 72	4,274 70
Commission of Engineers for Investigating, etc., of Water Supply	373 25		150 00	223 25
Revenue Bond Fund for Emergency Forces	8,241 11		3,016 83	5,224 28
Revenue Bond Fund for Photometric Stations	17,072 86		7,911 80	9,161 06
Revenue Bond Fund for Lighting Public Buildings During 1904	139,817 56		13,406 03	126,411 53
Water Fund, Borough of Brooklyn	1,260,105 12	3,435,408 58	1,645,087 72	3,050,425 98
Water Main Fund, Borough of Brooklyn	31,590 12	1 50	3,797 51	27,794 11
Water Construction, Borough of Brooklyn	649,510 15			649,510 15
Maintenance and Distribution of Water Supply, Borough of Brooklyn		1,744,764 59	1,372,459 55	372,305 04
Construction of High Pressure Fire Service, Borough of Brooklyn	1,131,072 69	24,760 16	607,993 31	547,839 54
Water Fund, Borough of Queens	518,884 18	5,184 56	169,049 47	355,019 27
Revenue Bond Fund for Laying Water Mains, Borough of Queens	176 80			176 80
Water Fund, Borough of Richmond	1,523,446 35	925 68	17,283 64	1,507,088 39
Total	$10,567,455 66	$7,521,617 82	$6,703,406 18	$11,385,667 30

Note—Expenditures were also made during the year to the amount of $334,544.60, chargeable to Maintenance and Distribution of Water Supply in the Borough of Brooklyn for the year 1905; $11,333.21 for the year 1904; $374 40 for the year 1903, and $9.66 for the year 1902.

DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY.

Comparative Statement of Collections for Account of the Water Service, Arrears, and Income of the Department for all Boroughs for the Years Ending December 31, 1905 and 1906.

	Manhattan.		The Bronx.		Brooklyn.		Queens.		Richmond.		All Boroughs.	
	1905.	1906.	1905.	1906.	1905.	1906.	1905.	1906.	1905.	1906.	1905.	1906.
Regular annual frontage rates	$2,048,899 95	$2,184,183 71	$355,592 61	$437,806 06	$1,698,479 26	$1,829,088 76	$54,562 90	$61,562 79	$404 44	$375 79	$4,157,939 16	$4,513,017 11
Penalties (section 476 of the Charter)	18,846 95	20,468 60	6,225 25	7,267 78	26,832 56	29,652 68	1,312 83	1,417 25	5 17	8 05	53,222 76	58,814 36
Meter Charges—												
Buildings	3,000,856 73	3,408,351 50	255,523 43	225,864 75	905,086 63	982,650 04	103,343 09	123,265 23	5,069 44	3,722 25	4,269,879 32	4,743,853 77
Riverdale			2,398 00	*.....							2,398 00	
Steamboats	157,816 77	146,765 30									157,816 77	146,765 30
Permits—												
Building purposes	62,002 43	52,458 64	43,255 97	29,228 72	64,555 75	69,215 92	3,171 37	5,008 02	120 07	104 90	173,105 59	156,016 20
Extras, boilers, etc	3,500 12	19,118 18	6,111 91	7,404 28			289 45				9,901 48	26,522 46
Tugs	24,247 50	40,704 79									24,247 50	40,704 79
Street sprinkling	11,110 42	9,332 75									11,110 42	9,332 75
Total	$5,327,280 87	$5,881,383 47	$669,107 17	$707,571 59	$2,694,954 20	$2,910,607 40	$162,679 64	$191,253 29	$5,599 12	$4,210 99	$8,859,621 00	$9,695,026 74
Tapping water mains	9,362 50	6,907 00	9,769 50	9,581 00	22,863 50	22,489 75	2,000 75	3,094 00			43,996 25	42,071 75
Labor and materials	6,158 11	5,109 81			7,626 39	8,684 35		499 25			13,784 50	14,293 41
Total revenue collected	$5,342,801 48	$5,893,400 28	$678,876 67	$717,152 59	$2,725,444 09	$2,941,781 50	$164,680 39	$194,846 54	$5,599 12	$4,210 99	$8,917,401 75	$9,751,391 90
Meter setting, account of Water Meter Funds	11,953 74	15,927 60	1,196 11	3,227 22		321 32					13,149 85	19,476 14
Total collections	$5,354,755 22	$5,909,327 88	$680,072 78	$720,379 81	$2,725,444 09	$2,942,102 82	$164,680 39	$194,846 54	$5,599 12	$4,210 99	$8,930,551 60	$9,770,868 04
Memorandum.												
Total revenue collected	$5,342,801 48	$5,893,400 28	$678,876 67	$717,152 59	$2,725,444 09	$2,941,781 50	$164,680 39	$194,846 54	$5,599 12	$4,210 99	$8,917,401 75	$9,751,391 90
Returns of Arrears, Receiver of Taxes, viz.:												
Water rents	326,898 72	271,788 03	49,368 28	50,209 58	730,508 71	171,397 76	24,783 86	26,082 09			1,131,559 57	519,477 46
Meter setting	2,962 94	19,308 37		4,678 87							2,962 94	23,987 24
Total income	$5,672,663 14	$6,184,496 68	$728,244 95	$772,041 04	$3,455,952 80	$3,113,179 26	$189,464 25	$220,928 63	5,599 12	$4,210 99	$10,051,924 26	$10,294,856 60
Increase, 1906, revenue		$550,598 80		$38,275 92		$216,337 41		$30,166 15	(Decrease)	$1,388 13	Net Increase,	$833,990 15
Increase, 1906, returns of arrears	(Decrease)	37,765 26		5,520 17	(Decrease)	559,110 95		1,298 23			Net Decrease,	591,057 81
Increase, 1906, income		511,833 54		43,796 09	(Decrease)	342,773 54		31,464 38	(Decrease)	1,388 13	Net Increase,	242,932 34
Increase, 1906, collections		554,572 66		40,307 03		216,658 73		30,166 15	(Decrease)	1,388 13	Net Increase,	840,316 44
Increase, 1906, meter setting		3,973 86		2,031 11		321 32					Net Increase,	6,326 29

*No collections on this private account since July, 1905.

RECAPITULATION.

	1905.	1906.	Increase, 1906.
Collections—			
Annual Frontage Rates and Penalties	$4,211,161 92	$4,571,831 47	$360,669 55
Meter Charges	4,430,094 09	4,890,619 07	460,524 98
Miscellaneous Charges	207,254 57	223,243 45	15,988 88
Tapping Permits	43,996 25	42,071 75	*1,924 50
Street Sprinkling	11,110 42	9,332 75	*1,777 67
Labor and Materials	13,784 50	14,293 41	508 91
Total Revenue	$8,917,401 75	$9,751,391 90	$833,990 15
Meter Setting	13,149 85	19,476 14	6,326 29
Total Collections	$8,930,551 60	$9,770,868 04	$840,316 44
Returns of Arrears—			
Water Rents	1,131,559 57	519,477 46	*612,082 11
Meter Setting	2,962 94	23,987 24	21,024 30
Total	$10,065,074 11	$10,314,332 74	$249,258 63

*Decrease.